



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Abe Nishiki

Appeal No. _____

Serial No.: 10/687,748

Group Art Unit: 3734

Filed: 10/20/2003

Examiner: Gettman, Christina D.

For: **A PLIERS-LIKE TOOL AND PROCESS FOR CURING PHIMOSIS**

APPEAL BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Honorable Members of the Board of Patent Appeals and Interferences:

The jurisdiction of the Board is invoked under 35 USC 134 and 37 CFR 1.191. A Notice of Appeal and payment therefor and payment for filing a Brief are enclosed herewith.

This Brief is filed in response to the Examiner's Third New Grounds of Rejection in this application mailed 12/28/2007. This Notice of Appeal and Appeal Brief are timely filed.

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i. Real Party of Interest

The real party of interest is Abe Nishiki whose mailing address is: 121-9, Aza Machata, Oh-Aza Myogazawa, Matsuyama-machi, Atsumi-gun, Yamagata Pref. Japan

ii. Related Appeals and Interferences

There are no known related appeals or interferences.

iii. Status of Claims

Claims 1-19 are present in this application.

Claims 1, 2 and 11 are rejected 35 USC 102(b) as being anticipated by Cox,
U.S. 4,754,746.

Claims 3 - 8 and 12 are rejected under 35 USC 103(a) as being unpatentable over Cox in
view of Ping, U.S. 6,116,124.

Claim 9 is rejected under 35 USC 103(a) as being unpatentable over Cox in view of
Schenk, U.S. 4,257,406.

Claim 10 is rejected under 35 USC 103(a) as being unpatentable over Cox in view of
Schenk and Tiedemann, U.S. Publication No. 2003/0233119.

Claims 13 - 15 are rejected under 35 USC 103(a) as being unpatentable over Cox in view of
Tillier, U.S. 1,477,786.

Claim 16 is rejected under 35 USC 103(a) as being unpatentable over Cox in view of Roux,
U.S. 4,124,929.

Claims 17 - 19 are withdrawn from consideration under 37 CFR 1.142(b) as being drawn to
a non-elected invention.

iv. Status of Amendments

There are no pending amendments.

v. Summary of Claimed Subject Matter

As set forth in the only independent claim 1, and dependent claims 2 - 16, the basic invention is disclosed in the Abstract (page 22 of the Specification). A plier-like device has handles 2L, 2R, that fulcrum on pivot pin 5 such that jaws 4R, 4L have upturned blades 3R, 3L with end ball hooks 3a that separate as the handles are brought together. A rack 8 pivots on a pin 9 to position the blades by use of pawl 7 (Figs 1 and 2; page 5, lines 5 through 20). These are set forth in claims 1 - 3, 5, and 9 - 12. The rack can have a guide groove 14, accommodating a spring-loaded projection 12, with a stop 16 to limit pivotal movement. The guide groove has a tapered surface at one end 14a to disengage the rack from the projection (page 9, lines 5 - 21) claims 6 - 8. As shown in Fig. 5, (page 11, lines 1 - 12) the rack can have an internal slit or slot 23, that accommodates a pawl 7, as set forth in claim 4. As shown in Fig. 6, the handles 32L, 32R, jaws and blades 34L, 34R can all be one integral shaped spring element (page 12, line 19 - page 13, line 16) with a flat rack 37 having cogs 38 that engage with the handle 32L of the spring element 31, claims 13 - 15.

Claims 1 - 3, 5 and 9 - 12 address the handle, jaw, blade, ratchet, and details of the enlarged hook means shown in Figs. 1 and 2.

Claim 4 adds to claim 3 the rack having a slot that accommodates the pawl shown in Fig. 5.

Claims 6 - 8 add to claim 3 the rack having a guide groove for accommodating a spring projection controlling rack movement of Fig. 1.

Claims 13 and 14 add to claim 1 that the handle, jaw and blade are all one integral shaped spring element as shown in Fig. 6.

Claim 15 adds to claim 14 the flat rack having cogs on one side that engage one handle of the integral spring element.

Claim 16 adds to claim 2 a spring 10 with the fulcrum pin 9 for biasing the handle grips.

vi. Grounds of Rejection to be Reviewed on Appeal:

If claims 1, 2 and 11 are anticipated by Cox.

If claims 3 - 8 and 12 are obvious over Cox in view of Ping.

If claim 9 is obvious over Cox in view of Schenk.

If claim 10 is obvious over Cox in view of Schenk and Tiedemann.

If claims 13 - 15 are obvious over Cox in view of Tillier.

If claim 16 is obvious over Cox in view of Roux.

vii. Arguments

Cox is used as the base or primary reference in all the rejections. For purposes of these arguments it will be assumed that the examiner read the claims and references. The claims are drawn to a phimosis curer. Not one of the references is drawn to a phimosis curer. Cox is drawn to a "Self-Retaining Metatarsal Spreader."

35 USC 102(b) Rejection of Claims 1, 2 and 11

Claims 1, 2 and 11 have been rejected as being anticipated by Cox (U.S. Patent No. 4,754,746) under 35 USC 102(b).

The "generally rectangular blades (5) of Cox extend downward from the swinging ends of the jaws (4) . . . for fitting between closely adjacent bones (Fig. 1) such as metatarsals (B). The trailing portions of the blades (5) are flared outward and rearward (19) from the planar contiguously engageable portions for wedging the adjacent bones apart and have concave depressions (21) for receiving the bones." (Abstract with emphasis and numerals added.) The concave portions 21 have criss-crossed grooves or ribs to bite into tissue surrounding the bones B and thereby prevent slippage (column 3, lines 22 - 38, Figs 2, 3 and 4).

Cox does not teach a phimosis curer and the structure for the claimed phimosis curer and the bone gripping and spreading "metatarsal spreader" of Cox are not the same. Claim 1 requires that the "ratchet means pivots between the first handle grip and said second handle grip" (lines 17 and 18). The ratchet means of Cox does not pivot. It is integral with the handle 1 (2nd handle, column 2, lines 29 - 32, Fig. 1). The arcuate ratchet of Cox merely extends through a slot 8 in

the second handle 1 (1st handle, column 2, lines 32 - 34). Cox does not anticipate this ratchet pivot structure.

Claim 1 further recites “a first enlarged hook means” and “a second enlarged hook means” on the first and second blade ends. The blade 5 ends of Cox are not enlarged. The blades 5 are rectangular “of substantially uniform width from top to bottom” (column 2, lines 57 - 60). The ends of the blades are bent to form a concave depression 21 flared rearward (column 3, lines 11 - 21, Figs 3 and 4). The claimed hooks 3a are shown in Figs. 1, 2, 3, 4 and 5 and as 35 in Fig. 6 and are clearly disclosed on page 5 of the Preferred Embodiments for example on lines 14 - 16 “The ball hooks 3a are formed in a near-spherical shape that forms spaces 3b - 3d in the top side and both the front and rear sides when the blades 3R and 3L are closed, so that the penis glands and foreskin interior are not sandwiched or pinched.” Claim 1 further distinguishes over the structure of Cox by requiring the tip sides and rear sides to protrude to prevent slipping (lines 24 - 26). The bend in Cox does not meet the hook means protrusions claimed. Cox does not anticipate this enlarged hook structure.

These structural differences are designed for entirely different purposes. The claimed structure is to prevent damage to the foreskin (claim 1, lines 27 and 28) while the structure of Cox is to “bite into the tissue” (column 3, lines 34 - 38). Further, as set forth on lines 27 - 29 of claim 1, when the blades are separated “enlarged hook means front sides are separated within the foreskin opening so that said phimosis curer will not damage the foreskin when it is inserted into the foreskin opening and said blades are separated.” The structure of Cox cannot perform this function. Cox does not anticipated this function.

Claims 2 and 11 depend from claim 1 and are not anticipated by Cox for the same reasons set forth above as being the reasoning he does not anticipate claim 1.

35 USC 103(a) Rejection of Claims 3 - 8 and 12

Claims 3 - 8 and 12 are rejected under 35 USC 103(a) as being unpatentable over Cox in view of Ping (U.S. Patent No. 6,116,124). Claims 4 - 8 and 12 all depend from claim 3.

As to claim 3, it recites details of the ratchet means. It claims a curved rack with cogs and a pawl with the rack attached to the first handle by a "first pivot pin" and the pawl attached to the second handle by a second pivot pin. Neither end of the curved rack of Cox is attached by a pin. The device of Ping is not to a phmosis curer but to a non-analogous "Adjustable Pliers." As described by *Webster's Dictionary* "pliers" are small pincers for handling small objects, bending, and cutting, etc.; and "pincers" is a tool consisting of two arms hinged together ... used to crush, extract, grab, etc.; and "pincer movement" is converging forces from opposing directions on a position. This is precisely what Ping discloses. It is not for spreading anything, it is for clamping object(s). Ping has no ratchet, contrary to the Examiner's allegation. The portion the Examiner alludes to in Ping is a locking mechanism. The control arm 20 of Ping is for fixing the arm spacing 11,12 (paragraph 0024), it has a shank portion 29 and a head portion 26. The head portion 26 has an arcuate surface that pivots or rotates around pin 22 on the same end of the control arm. First there are no ratchet cogs. The teeth of Ping taper in both directions while "cogs" are tapered only in one direction. Attention is directed to *Webster's Dictionary* where a ratchet engages with a pawl "to prevent reverse motion." The lock arm 41 is not a pawl. It has lock points 43 that are manually moved out of contact with the teeth 40 by moving finger piece

44 to disengage lock nobs 47 from indents 46 (column 3, lines 18 - 36; column 5, lines 1 - 9).

The lock means of Ping prevent motion in either (both) direction(s) as is standard in pliers. If Ping teaches Cox anything it is that motion can be prevented in both directions by use of locking means. Ping further teaches away from the claimed invention by requiring that the pivot pin 22, for the control arm 20, and the pivot pin 42, for the lock arm 41, are both attached to the same handle 3. The pin 15 is mentioned by the examiner as being a part of a ratchet. The examiner's interpretation of Ping is a little far-fetched. Ping has four pins, three are permanently fixed onto one handle, 15, 22, and 42 are on handle 3. The fourth is not fixed to the second handle 2, it is a fixed distance from the pin 22 on control arm 20 and is free to rotate or pivot around 22. First, 15 is not a pawl, it is a stationary pin in one handle neck 9. Second, the pin 15 and pin 22 are stationary and spaced apart on the same handle precluding relative motion between the two. Third, notches 33 are not a part of a pawl, they are holding notches in handle 2 neck 8. The slot 16, is not curved, it is linear in one flat linear handle neck 8, they, i.e. the notches 33 are not on or in a curved rack. Fourth, the pawl is claimed as being attached to a second handle grip second end, but the pin 27 of Ping is only attached to the control arm 20 and freely slides in the slot 68 and the second handle 2. Line 4 of claim 3 requires that the rack be attached to the first handle grip by the first pin, and line 5 requires the pawl to be attached to the second handle by a second pin. Following this teaching of Ping, by using it in Cox, would render Cox inoperative for performing its intended purpose of the one way restricted spacing adjustment and then holding the handles 1 of Cox apart by simply pushing the finger rings 2 toward each other.

The patent to Ping is to a non-analogous art, does not teach the structure claimed, and if used in Cox would render the patent to Cox inoperative for its intended purpose of spreading and holding.

Claim 4 depends from claim 3 and is allowable therewith and is independently patentable.

As to claim 4, neither Cox nor Ping teach a curved rack with a slot (23) along its interior length. Neither Cox nor Ping teach a pawl (7) within a slot of any size as required by claim 4 and shown in Fig. 5. Neither the pin 15 nor the pin 27 of Ping are pawls. Neither pin 15 nor pin 27 of Ping are pivots for a pawl. Since neither of the references teach the structure claimed they cannot teach nor render the claimed structure obvious.

Claim 5 depends from claim 3 and is allowable therewith and is independently patentable.

As to claim 5, neither Cox nor Ping teach a curved rack (8) with an irregular surface (11) that pivots toward and away from the pawl (7). The rack of Cox does not pivot, it is rigidly attached to, or is an integral part of the handle 1. Ping has no ratchet and no pawl. The irregular teeth 40 of Ping rotate about a pin 22, they do not pivot toward or away from anything. The pivot 22, for the head portion 26, and the pivot 42, for the lock arm, are a fixed distance apart on the same handle. This means that the distance between the pivot 22 and the pivot 42 is the same at all times. The rotation of the head portion 26 does not make the irregular surface 40 any closer toward or further away from the points 43. The rotation of the lock arm 41 may move the lock pin 43 toward and from the teeth 40, but claim 5 (lines 2 - 5) requires the rack to pivot toward and away from the pawl. Ping has no curved rack and no rack that pivots to and from a

Neither Cox nor Ping teach the claimed structure or function. Since neither reference teaches the structure or function claimed they cannot render the claim obvious.

Claim 6 depends from claim 3 and is allowable therewith and is independently patentable.

Claim 6 requires a curved rack with a lower surface having a guide groove (14). The guide groove 68 of Ping is in and extends along the handle 2 to slidably accommodate pin 27 and position one end of the control arm 20 along handle 2. This structure is foreign to both the structure and function claimed. The use of the slot of Ping in the rack of Cox would render Cox inoperative since Cox requires the rack to traverse through the slot 8 in the handle while the pins 22 and 27 of Ping preclude the control arm 20 from traversing through the handle. Neither Cox nor Ping have a curved rack with a guide groove. Since neither patent teaches the claimed structure, they cannot render the claim obvious. Neither reference teaches a spring-loaded projection for maintaining contact. Claim 6 is not obvious over Cox in view of Ping.

Claim 7 depends from claim 6 and is allowable therewith and is independently patentable.

In addition to the structure and function of claim 6, claim 7 includes the limitations that the projection in the groove controls movement of the rack with respect to the pawl. Movement of the teeth 40 of Ping is controlled by the fixed pin 22. Neither Cox nor Ping teach this structure or provide this function. Claim 7 is not obvious over Cox in view of Ping.

Claim 8 depends from claim 7 and is allowable therewith and is independently patentable.

In addition to the structure of claim 7, claim 8 requires that the guide grooves (14) terminate

in a decreasing depth taper (14a) for pressing the projection (12) out of the groove. Since neither Cox nor Ping teach the guide groove they cannot and do not teach the specific structure or function of the guide groove or the taper in the groove. Claim 8 is not obvious over Cox in view of Ping.

Claim 12 depends from claim 3 and is allowable therewith and is independently patentable.

The irregular surfaces 40 of Ping are not cogs and are equal fixed distances with respect to pivot 22. They can only rotate about 22 and there is no bias means on the pivot pin 22 and so the irregular surfaces cannot be biased toward a pawl. The cogs (7) of Cox are stationary on the rack (6) that is stationary on the handle 1 so there cannot be a biasing movement of the rack to the pawl. Since neither Cox nor Ping teach a rack biased toward a pawl, they cannot render claim 12 obvious.

35 USC 103(a) Rejection of Claim 9

Claim 9 is rejected under 35 USC 103(a) as being unpatentable over Cox in view of Schenk (U.S. Patent No. 4,257,406).

Claim 9 depends from claim 1 and is patentable therewith and is independently patentable. In addition, claim 9, lines 1 - 3, adds to claim 1 details of the enlarged hook means. It recites that the hook means is in the “shape of a ball with finished smooth curved surfaces” and with “spaces provided to preclude damage to the penis glands and from pinching the foreskin;” lines 1 - 3 (i.e., Fig. 2, spaces 3b, 3c, 3d; specification page 5, lines 14 - 16).

The patent to Schenk is to a non-analogous art, an “Iris Retractor and Pupil Dilator.” The device of Schenk is to a pair of cross-section leaf spring arms 11,12 having tips 19, 20 that move together when the arms 11,12 are moved away from each other and move away from each other when the arms are moved together. The device is used to retract the iris of an eye and has a stop 32, 33 to limit spread of the tips with stop 23 preventing contact of the tips while kept in alignment by aperture and pin 24, 25. The tips 19, 20 are arcuate curved outwardly convex lunar shaped arcs (Fig. 1; column 2, lines 34 - 43).

The device of Schenk provides tips that are adjusted to the maximum separation. There is no ball tip. The outwardly convex lunar-shape tips are formed from the narrow end of the extension 18. The narrow tips are designed so as to enable the tips to slip through the corneal incision with the heel 42 in contact with the incision (Figs. 3 and 4; column 3, line 54 - column 4, line 4; column 5, lines 29 - 44). The inner concave surface 60 is designed to contact the iris (column 4, lines 21 - 23) and the inner surface is used to capture and position the iris (column 4, lines 45 - 50). The device is designed for only left hand use, but could be designed for right hand use (column 5, lines 51 - 54).

The shape and function of the Cox and Schenk ends are similar. Neither Cox nor Schenk teaches an enlarged hook means in the general shape of a ball “with spaces” to preclude “damage to the penis glands and from pinching the foreskin.” Since both references teach away from the claim function and neither teaches the claimed structure, they cannot render the claim obvious.

35 USC 103(a) Rejection of Claim 10

Claim 10 is rejected under 35 USC 103(a) as being unpatentable over Cox and Schenk as in claim 9 taken with Tiedemann (Publication US 2003/0233119, published December 18, 2003).

The publication to Tiedemann is to a non-analogous art, "Port Deaccessor and Methods of Use." Tiedemann teaches a pair of forceps having non-slip coatings. The teaching of Tiedemann that a non-slip coating 25 can be applied to forceps (paragraph 0026) or anything else, does not overcome the deficiencies of Cox. Neither does it make obvious applying a coating to an enlarged hook or that of using a hook with the structure recited in claim 9. The ends of the blades of Cox are deliberately grooved to "bite into tissue" and prevent slippage (column 3, lines 34 - 38). If the coating of Tiedemann were placed on Cox, the device of Cox would be inoperative for its intended purpose. In view of this, the combination of Tiedemann and Cox is not proper in view of their specific divergent teachings.

35 USC 103(a) Rejection of Claims 13 - 15

Claims 13, 14 and 15 are rejected under 35 USC 103(a) as being obvious over Cox in view of Tillier (U.S. Patent No. 1,477,786). Claims 13 - 15 depend from claim 1 and are patentable therewith and are independently patentable.

As to claims 13 and 14, the patent to Tillier is to a non-analogous art, a "Piston Ring Expanding Tool." The patent to Tillier teaches a single strip of spring metal bent to form two opposed handles or jaws 5 so that the jaws cross each other at 8 (column 1, lines 42 - 53; Figs 1 and 2). The ends of 9 have tips with recesses 10 to fit over the "square end of a piston ring" (column 2, lines 65 - 70). The handles are forced inwardly to grip a piston ring and are released

to spread the ends of the ring (column 2, lines 80 - 86). Tillier has no pivoted ratchet between handles and Tillier has no enlarged hook means as required by parent claim 1. Since neither Cox nor Tillier teach a pivoted ratchet means or an enlarged hook means as required by Claim 1, they cannot teach or make claim 13 or claim 14 obvious. Further, like Cox, the end structure 10 of Tillier would tear up any foreskin it was placed in. These references both teach away from the claimed structure and function and would be inoperative insofar as the claimed structure of damage avoidance is concerned.

Claim 15 depends from claim 13 and is patentable therewith and is independently patentable.

Claim 15 additionally sets forth the details of the ratchet (37) and the interaction between the ratchet and handle grip (32 L). Further, there is no teaching of having a handle grip inserted into a cog (38) of a ratchet to secure the distance between the first and second handle grips. Since neither reference teaches the structure or function claimed, the combining of Cox and Tillier cannot render the claim obvious.

35 USC 103(a) Rejection of Claim 16

Claim 16 is rejected under 35 USC 103(a) as being unpatentable over Cox in view of Roux (U.S. Patent No. 4,124,929). Claim 16 depends from claim 2 and is patentable therewith. Roux is a patent that is to a non--analogous art, "Extractor for Watch Push Buttons." Both the function of extracting watch push buttons and structure are unrelated to phimosis curing.

The patent to Roux teaches jaws 6 and 7 with the jaw 6 having an outwardly protruding stud 8 having an opening or central recess 10 forming sharp shoulders 12 (Figs 1 and 2, column 2, lines 20 - 34) for engaging a push button and an opposite jaw 7 with a surface 16 for engaging a watch case (column 2, lines 43 - 50). Even if the patents to Roux and Cox were combinable, adding the spring of Roux into Cox would not make claim 16 obvious. Roux does not teach a spring ratchet combination as claimed and, like Cox, the structure 8,18 of Roux would tear up any foreskin it were placed in. Claim 16 is not obvious over Cox in view of Roux.

Applicable Law

The legal requirements for rejecting claims have not been met.

35 USC 102(b) Rejection

Claims 1, 2 and 11 have been rejected under 35 USC 102(b) as being anticipated by Cox. As to anticipation, the basic requirements necessary for making a 35 USC 102(b) anticipation rejection have not been complied with.

The claimed structure is to a phimosis curer. The patent to Cox is to a metatarsal spreader. The ratchet segment 6 of Cox does not pivot as claimed. The blade structure of Cox is to bite into tissue while the enlarged hook structure claimed is to prevent damage. To constitute an appropriate rejection under 35 USC 102(b) requires that the disclosure or prior patents be read unaided by teachings of the subject matter which they are alleged to anticipate. Technical Tape Corp. v. Minnesota Mining and Mfg. Co., 110 USPQ 160 (D.C.S.D. NY 1957). There can be no 35 USC 102 anticipation unless all of the same elements are found in exactly the same situation

and united in the same way to perform identical functions as a single prior art reference.

Corometrics Medical Systems v. Berkeley Bio-Engineering, 193 USPQ 467 (D.C.N.D. Calif. 1977); Johnson & Johnson v. Gore & W.L. Gore & Assoc., 195 USPQ 487 (D.C. Del. 1978); Scott v. Inflatable System, 222 USPQ 460 (9th Cir. 1983). The functional language recited in the claims precludes a 35 USC 102 rejection. Functional language in claims must be given full weight and may not be disregarded in evaluating patentability. Ex parte Bylund, 217 USPQ 492 (BdApp1981)..

35 USC 103(a) Rejections

No legally acceptable obviousness rejection has been made. The references are all drawn to non-analogous art and fail to conform to requirements for combining references and taken together do not teach either the structure or function claimed.

1. Preamble

The references do not meet the Preamble. Claims 1 - 16 are allowable because a phimosis curer is being claimed and not one of the references teaches curing phimosis.

The preamble recites a phimosis curer and the claims clearly address the structure and function, i.e. "insertable into a foreskin opening." "protrude to prevent . . . slipping out of a foreskin," "so that said phimosis curer will not damage the foreskin when it is inserted into the foreskin." As here, when a preamble is essential to understanding the claim itself, the relevant prior art is limited. Freund Industrial Co. V. Driam Metall Product GmbH Co., 12 USPQ 2d 1641 (DCSNY 1989). While the preamble is not normally considered part of the claim, it is

deemed part of the claims where necessary to breath “life and meaning” into the claims. Corning Glass Works v. Sumitomo Electric USA, 9 USPQ 2d 1962 (Fed Cir 1989). The purpose set forth in the preamble is more than a mere statement of purpose, it is essential to particularly point out the invention defined by the claims. The limitations appearing in the preamble are necessary to give meaning to the claims and properly define the invention. In re Bullock, 203 USPQ 17 (CCPA 1979); Computervision Corp., 221 USPQ 669 (Fed Cir) cert. Denied, 469 U.S. 857 (1984).

2. Non-analogous Art

The references are not analogous to the invention. Claims 1 - 16 are allowable because the references applied are all from non-analogous arts.

Determining non-analogous art is two-fold: first, court decides if reference is within field of inventor’s endeavor; if it is not, court proceeds to determine whether reference is reasonably pertinent to particular problem with which inventor was involved. In re Wood and Eversole, 202 USPQ 171 (CCPA 1979). For the teachings of a reference to be prior art under 35 USC 103, there must be some basis for concluding the reference would have been considered by one skilled in the particular art working on the pertinent problem to which the invention pertains. For no matter what a reference teaches, it could not have rendered obvious anything, “at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains, “ unless said hypothetical person would have considered it. In re Horn, Horn, Horn, and Horn, 203 USPQ 969 (CCPA 1979).

In the instant case, none of the references are from the inventor's field of endeavor, and none of the references address the problem the inventor is solving.

3. Function Ignored

The references do not teach the function or claim wording. Claims 1 - 16 are allowable because not one of the references discloses the wording claimed or the function recited in relation to the claimed structure.

Combining separate teachings in the prior art references must be based on a suggestion or motivation therefor. All words of the claim must be considered in judging the patentability of a claim against the prior art. In re Miller, 169 USPQ 597 (CCPA 1971). A rejection cannot be sustained when the prior art is incapable of functioning as required by the claims and achieving what is achieved by the invention. When this situation exists, the Examiner has failed to make out a prima facie case. Ex parte Gould, 231 USPQ 943 (Bd App 1986). The requirements of a claim cannot simply be ignored. In re Ehrreich et al, 200 USPQ 504 (CCPA 1979). To show obviousness the structure of the references must perform the same function in substantially the same way to produce substantially the same result. Pennwalt Corp. v. Durance Wayland, Inc., 4 USPQ 2d 1737 (CAFC 1987).

4. Problem Addressed

Claims 1 - 16 are allowable because the claims are drawn to the problem of curing phimosis and not one of the references addresses the phimosis problem solution. The claims and references all address different problems.

The prior art must address and provide the inventor's answer to the particular problem confronting an inventor. In re Winslow, 151 USPQ 48 (CCPA 1966). The relationship between the problem the inventor was attempting to solve and the problem to which any prior art reference is directed is highly relevant. Stanley Works v. McKinney Mfg. Co., 216 USPQ 298 (Del DC 1981); In re Luvisi and Nohejl, 144 USPQ 646 (CCPA 1965).

5. Combining Prior Art References

Claims 3 - 10 and 12 - 16 are allowable because the references are not properly combinable. There must be a motivation to combine different aspects of an invention. No mechanic in an art would combine one reference with another that would render the first inoperative in whole or in part.

An examiner cannot establish obviousness by locating references which describe various aspects of a patent applicant's invention without also providing evidence of the motivating force which would impel one skilled in the art to do what the patent applicant has done. Ex parte Levengood, 28 USPQ 2d 1300 (BdApp 1993). The references must show at least part of the claimed invention. It is fundamental that a valid reference is good for what it discloses and must show all or part of the invention for which a patent is sought. In re Stemple, Jr., 113 USPQ 77 (CCPA 1977). The references combined must have a reasonable chance of success. Criterion for determination of obviousness is whether the prior art would have suggested to one of ordinary skill in the art that the combination of references should be carried out and would have a reasonable likelihood of success viewed in the light of prior art. In re Dow Chemical Co., 5 USPQ 2d 1531 (Fed.Cir. 1988). Claims are allowable when nothing in the prior art supports

the rejection. Where nothing in the prior art suggests to one of ordinary skill in the art the desirability of combining the features shown in the different references, the claims should be held to be allowable. In re Osweiler, 145 USPQ 691 (CCPA 1965). The claim is allowable when any one element of a combination is not obvious. Where a claim to a combination includes one or more elements that is by itself nonobvious, then the entire claim meets the nonobvious test of 35 USC 103. In re Hirao, 190 USPQ 15 (CCPA 1976).

6. References Require Modification

Claims 3 - 10 and 12 - 16 are allowable because the references are not properly combinable and the references when combined do not teach the claimed structure.

Patents are references only for what they clearly disclose or suggest. It is not proper use of a reference to modify its structure to one which prior art references do not teach. In re Randal et al, 165 USPQ 586 (CCPA 1979). The totality of the prior art leads away from the claimed invention. In re Hedges, 228 USPQ 685 (CAFC 1986). The claimed device need not necessarily be better than the prior art. A combination of references which requires a change in the basic principle, under which the basic reference was designed to operate, is improper. In re Ratti, 123 USPQ 349 (CCPA 1959).

7. Hindsight rejections.

The rejections are based on hindsight. Claims 1 - 16 are allowable because the random collection of prior art and the interpretation of the prior art clearly indicates an attempt to splice elements from the references into the claimed subject matter based solely on applicant's

disclosure. The fact that the prior art elements are being misrepresented and combined in a manner that is inconsistent with their use and that they render the prior art devices inoperative for their intended purposes clearly shows a hindsight reconstruction.

More than an opinion or speculation and hindsight are required to reach a legal conclusion of obviousness. In re Sporck, 133 USPQ 360 (CCPA 1962). A combination rejection must be supported by something other than applicant's own disclosure. In re Shaffer, 108 USPQ 326 (CCPA 1956). To imbue one of ordinary skill in the art with knowledge of the invention, when no prior art reference or references of record suggest that knowledge is hindsight where that which only the inventor taught is used against its teacher. W.L. Gore & Associates v. Gorlock Inc., 220 USPQ 303 (CAFC 1983); In re Harry Spinnoble, 160 USPQ 237 (CCPA 1969). The use of appellant's disclosure in reconstruction of references to meet claims is barred since, under 35 USC 103, obviousness must be tested at the time the invention was made; and, claims are allowable when the only source which would leave a person of ordinary skill to make the last step in reconstruction is appellant's disclosure. In re Pavlecka, 138 USPQ 152 (CCPA 1963).

35 USC 103(a) SUMMARY

The claims are not obvious:

- (a) None of the references are from the inventor's field of endeavor.
- (b) None of the references are from the same art.
- (c) None of the references address the inventor's problem.
- (d) None of the references are properly combined.

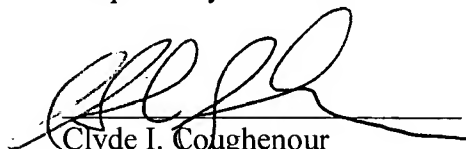
- (e) None of the references individually or collectively teach the claim structure.
- (f) None of the references individually or collectively can perform the claim function.
- (g) The rejections are no more than an attempt to collect individual components from extraneous patents and splice them together to reject the claims based only on the claim structure.

The claims define a patentable invention that is not obvious in view of the references of record.

CONCLUSION

Claims 1 - 16 define patentable subject matter and are in condition for allowance. The examiner's rejection of claims 1, 2 and 11 under 35 USC 102(b) as being anticipated and claims 3 -10 and 12 - 16 under 35 USC 103(a) as being obvious should be reversed and such action is respectfully requested.

Respectfully submitted



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viii CLAIMS APPENDIX

Claims on Appeal

Claim 1. A phimosis curer comprising;

a first handle grip having a first end and a second end and a second handle grip having a first end and a second end;

a first jaw having a first end and a second end and a second jaw having a first end and a second end;

a first blade having a first end and a second end and a second blade having a first end and a second end;

said first handle grip second end and said first jaw first end are joined together;

said second handle grip second end and said second jaw first end are joined together;

said first blade first end and said first jaw second end are joined together;

said second blade first end and said second jaw second end are joined together;

said first blade and said second blade extend upwardly from said first jaw and said second jaw respectively so as to be insertable into a foreskin opening;

said first handle grip and said first jaw are joined to said second handle grip and said second jaw such that moving said first handle grip and said second handle grip toward each other moves said first jaw and said second jaw away from each other;

a ratchet means pivots between said first handle grip and said second handle grip adjacent said first handle grip second end and said second handle grip second end;

said ratchet means is designed to selectively prevent said first handle grip and said second handle grip from moving away from each other;

a first enlarged hook means on said first blade second end and a second enlarged hook means on said second blade second end, said first enlarged hook means and said second enlarged hook means having tip sides and front sides and rear sides with said enlarged hook means first and second enlarged hook means tip sides formed so as to protrude, and said rear side of said first elongated hook means and said rear side of said second elongated hook means protrude to prevent said first blade and said second blade from slipping out of a foreskin opening when said first blade and said second blade enlarged hook means front sides are separated within a foreskin opening so that said phimosis curer will not damage the foreskin when it is inserted into the foreskin opening and said blades are separated.

Claim 2. A phimosis curer as in claim 1 including:

a fulcrum pin attaching said first handle grip and said second handle grip together so that said first handle grip and said first jaw can be pivoted relative to said second handle grip and said second jaw.

Claim 3. A phimosis curer as in claim 2 wherein:

said ratchet means includes a curved rack with an upper surface, a lower surface, a first side surface and a second side surface, a first end, a second end, cogs, and a pawl;

said curved rack first end is attached to said first handle grip second end by a first pivot pin;

said pawl is attached to said second handle grip second end by a second pivot pin.

Claim 4. A phimosi curer as in claim 3 wherein:

said curved rack is provided with a slot along its interior length;

said pawl fits within said curved rack slot;

said slot is wide enough to accommodate said pawl in both the engaged position, against said cogs on said curved rack when said first handle grip and said second handle grip are pivoted toward each other, and the disengaged position, away from said cogs on said curved rack, for permitting said first handle grip and said second handle grip to be pivoted away from each other.

Claim 5. A phimosi curer as in claim 3 wherein:

said curved rack is provided with one smooth side surface and one irregular cog surface;

said curved rack irregular cog surface pivots toward said pawl to selectively engage said pawl with said irregular cogs, and away from said pawl to remove said curved rack from contact with said pawl.

Claim 6. A phimosi curer as in claim 3 wherein:

said curved rack lower surface has a guide groove;

said second handle grip second end has a spring-loaded projection;

a stop is positioned on said second handle grip second end on said first side surface of said curved rack second end and said pawl is positioned on said second side surface of said curved rack to limit pivotal movement of said curved rack about said first pivot pin to keep said spring-loaded projection against said curved rack lower surface at all times.

Claim 7. A phimosis curer as in claim 6 wherein:

said spring-loaded projection extends into said guide groove when said guide groove is positioned above it;

said guide groove controls the pivotal movement of said curved rack about said first pivot pin when said projection is in said guide groove to maintain said pawl disengaged from said cogs on said curved rack.

Claim 8. A phimosis curer as in claim 7 wherein:

said guide groove terminates in a decreasing depth taper adjacent to said curved rack second end so that moving said first handle grip and said second handle grip away from each other pushes said projection from said guide groove by pressing said projection into said second handle grip;

resilient means bias said curved rack toward said pawl to maintain said pawl in engagement with said cogs when said projection is released from said guide groove.

Claim 9. A phimosis curer as in claim 1 wherein:

said enlarged hook means are in the general shape of a ball with finished smooth curved surfaces and with spaces provided to preclude damage to the penis glands and from pinching the foreskin.

Claim 10. A phimosis curer as in claim 9 wherein:

said enlarged hook means are coated with an inert material not harmful to the human body.

Claim 11. A phimosis curer as in claim 1 wherein:

said first handle grip and said first jaw and said first blade and said first enlarged hook means are one integral part;

said second handle grip and said second jaw and said second blade and said second enlarged hook means are one integral part.

Claim 12. A phimosis curer as in claim 3 wherein:

a bias means with said first pivot pin for biasing said cogs on said ratchet means curved rack toward said pawl.

Claim 13. A phimosis curer as in claim 1 wherein:

said first handle grip and said first jaw and said first blade and said first enlarged hook means and said second handle grip and said second jaw and said second blade and said second enlarged hook means are all one integral shaped spring element.

Claim 14. A phimosis curer as in claim 13 wherein:

said first handle grip first end and said second handle grip first end are united together;

said first jaw and said second jaw criss-cross each other.

Claim 15. A phimosis curer as in claim 13 wherein:

said ratchet means has a flat rack having a first side edge and a second side edge;

said flat rack is attached to said second handle grip;

cogs are formed along said flat rack first side edge;

said ratchet means is engaged by selectively placing said first handle grip into one of said cogs on said flat rack first side.

Claim 16. A phimosis curer as in claim 2 including:

a spring with said fulcrum pin for biasing said first handle grip and said second handle grip away from each other.

ix EVIDENCE APPENDIX

References relied on by the Examiner:

Tillier, U.S. 1,477,786, issued 18 December 1923

Roux, U.S. 4,124,929, issued 14 November 1978

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Dec. 18, 1923.

V. C. TILLIER

1,477,786

PISTON RING EXPANDING TOOL

Filed Feb. 15, 1923

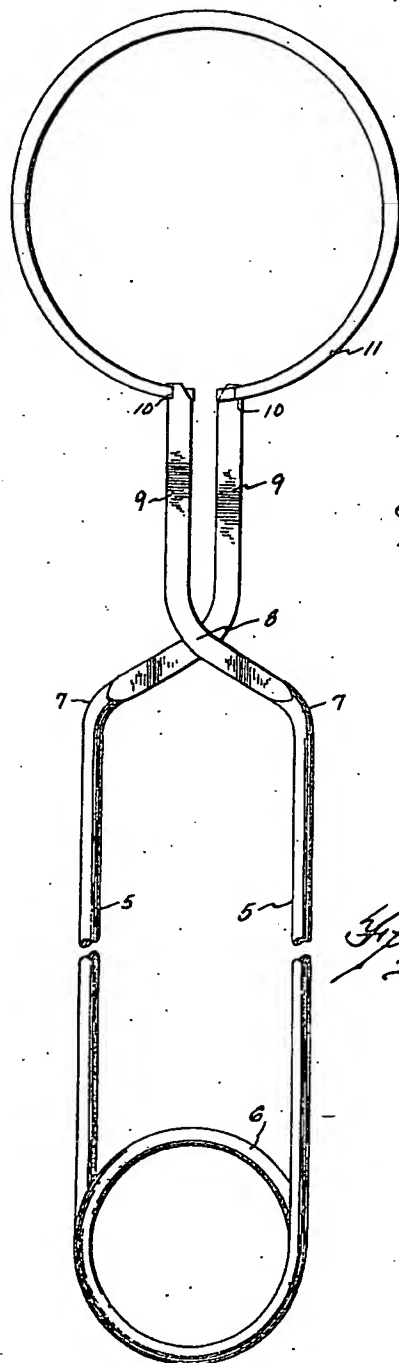


Fig. 1

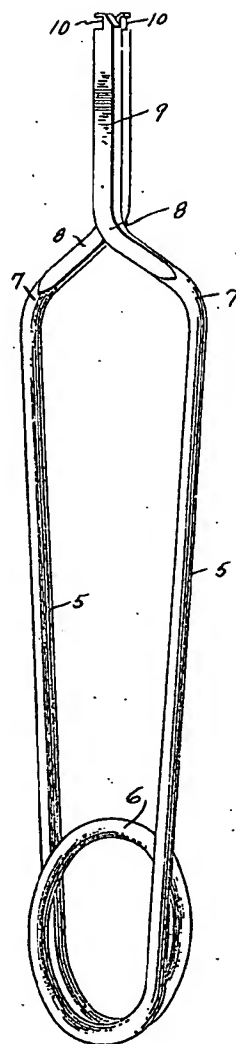


Fig. 2

Inventor

Vincent C. Tillier.

By *Raymond A. Parker*
Attorney

UNITED STATES PATENT OFFICE.

VINCENT C. TILLIER, OF FLINT, MICHIGAN.

PISTON-RING-EXPANDING TOOL.

Application filed February 15, 1923. Serial No. 619,209.

To all whom it may concern:

Be it known that I, VINCENT C. TILLIER, a citizen of France, residing at Flint, county of Genesee, State of Michigan, have invented a certain new and useful Improvement in Piston-Ring-Expanding Tools, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to an improved piston ring expander or removing tool.

The object is to provide a simple, efficient, improved piston ring expander, the ring-engaging portions of which may be easily inserted between the opposite ends of a piston ring at the split and which is so constructed that the gripping pressure of the hand applied to the jaws of the expander will operate the tool to spread apart the ring-engaging portions to remove the ring from the piston.

A further object is to provide a piston ring expander of a single piece of spring metal so constructed that the expansive force produced by gripping the jaws within the hand is applied to a piston ring to spread the opposite ends of the ring at the split directly apart without exerting outward radial pull on the ends of the ring.

The above and other objects together with the construction and the operation of the device will more fully appear from the following description, appended claims and accompanying drawing, in which:

Figure 1 is a perspective of my improved tool.

Fig. 2 is an elevation showing the tool in association with a piston ring.

My improved tool is formed from a single strip of spring metal. I have here shown a spring metal rod bent to form two opposed handles or jaws 5. This rod is so bent that the jaws are connected together at one end by means of a spring coil 6. The jaws extend forwardly tangentially from this coil in substantially parallel relationship and each jaw is bent at an angle as at 7 so the jaws cross each other as at 8 and these end extensions of the jaws are preferably flattened as shown in the drawing. At the crossing point

of the jaws each jaw is bent to extend forwardly so that when the tool is in the normal position the end portions 9 of the jaws overlap each other as shown in Fig. 1.

Each jaw is adapted on one face at the tip to engage the end of a piston ring at the split so that when pressure is applied by the hand to force the jaws together intermediate the spring coil 6 and the crossing point of the jaws, the ring-engaging ends of the jaws are spread apart to expand the ring.

In the construction here shown I have provided the opposite faces of the jaws with a recess 10 which is adapted to fit over the square end of a piston ring 11 as shown in Fig. 2, so as to expand the ring as shown in such figure of the drawing. It is apparent that the gripping faces of the jaws would have to be shaped to engage the different types of piston rings. There are many types of piston rings on the market, some having square ends, others beveled ends of various forms, and the engaging ends of the expander would, therefore, have to be adapted to engage with these various types of ring construction.

In operation the spring handles are forced inwardly by the gripping of the hand between the coil and the crossing point of the handles and the coil also yields so that the ends of the ring are spread substantially directly apart with little, if any, radial pull outwardly.

What I claim is:

1. A piston ring expander, consisting of a single piece of spring metal bent to form a pair of jaws connected together at one end by a spring coil and crossing each other intermediate the coil and the opposite end of the jaws and having overlapping free ends the tips of which are provided on opposite faces to engage the ends of a piston ring.

2. A piston ring expander formed of a one-piece spring metal rod bent to form two jaws connected together at one end by a spring coil, said jaws extending tangentially forwardly in the same general direction but from opposite sides of the coil and in substantially parallel relationship, each jaw bent inwardly intermediate the coil and its free end so that the jaws cross each other, the free ends of said jaws then bent forwardly at the crossing point in substantially

overlapping relationship, opposite sides of the tips of said jaws adapted to engage the ends of a piston ring.

3. A piston ring expander formed of a one-piece metal strip bent to form two jaws connected together by a spring coil, said jaws extending away from the coil in the same direction and bent to cross each other

intermediate the coil and their free ends, the opposite side of the tips of the free ends of the jaws adapted to engage the ends of a piston ring.

In testimony whereof I sign this specification.

VINCENT C. TILLIER.

[54] **EXTRACTOR FOR WATCH PUSH BUTTONS**

[76] Inventor: **Jean Roux**, Clos a Bec, La Sagne, Switzerland, 2314

[21] Appl. No.: **811,202**

[22] Filed: **Jun. 29, 1977**

[30] **Foreign Application Priority Data**

Jun. 28, 1976 [CH] Switzerland 7992/76

[51] Int. Cl.² **B23P 19/04**

[52] U.S. Cl. **29/268; 81/5.1 R; 81/421**

[58] Field of Search **29/268; 81/5.1, 421-424, 81/302, 125**

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Primary Examiner—James L. Jones, Jr.

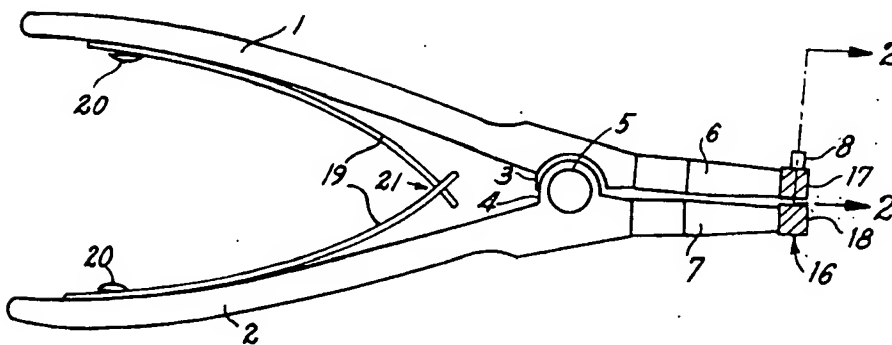
Attorney, Agent, or Firm—Sherman & Shalloway

[57]

ABSTRACT

An extractor for the push button members of wrist watches is disclosed which is in the form of expanding pliers having one of its jaws carrying a pressing stud generally at right angles to the jaw for engaging the sleeve of the push button, while the other jaw of the unit has a portion opposite the stud for bearing against the opposite wall of the watch case to provide a base so that the stud is pressed against the push button sleeve when the handles of the unit are pressed together.

8 Claims, 3 Drawing Figures



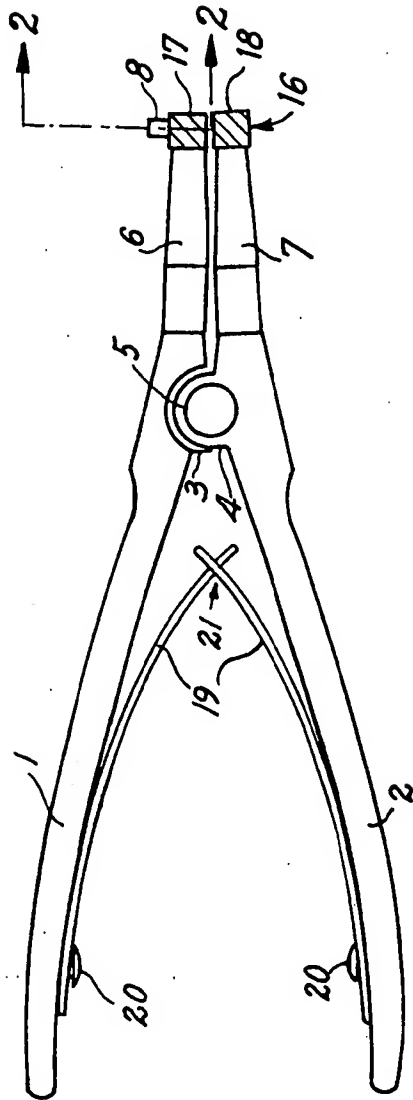


Fig. 1

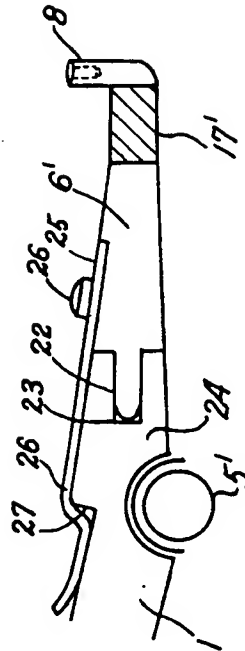


Fig. 3

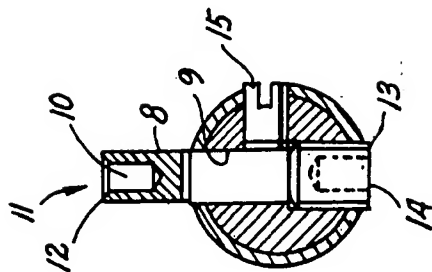


Fig. 2

EXTRACTOR FOR WATCH PUSH BUTTONS

BACKGROUND OF THE INVENTION

The present invention relates to the repair of watches and is concerned more particularly with a tool for the extraction or ejection of push buttons from the case of wrist or pocket watches.

BRIEF DISCUSSION OF THE PRIOR ART

Many contemporary watches such as chronographs or electronic units include push buttons or setting components such as a sweep hand or for activating various functions such as the energization of LED read-outs. Therefore, the repair of such watches frequently requires the removal of such push buttons.

Heretofore, these buttons have been removed either by the use of a pair of pliers engaging the external portion or head of the button or by a drift or driving instrument which was tapped or hammered against the internal portion of the button to effect its removal. With the use of pliers, the push buttons suffer considerable damage ranging from a scoring of the exterior surface to a substantial flattening or collapse of the button structure. In the use of drift pins, not only was the force delivered against the push button sufficient to destroy the usefulness of the button but, quite often, mishaps would occur which would cause severe scratching or gouging of the watch case, deformation of the threads of the case or similar types of damage.

Therefore, prior means for extracting push buttons from watch cases have not been found to be entirely satisfactory.

SUMMARY OF THE INVENTION

In general, the preferred form of the present invention comprises a pair of expansion pliers having a pair of handles joined by a hinge and each having a jaw extending forwardly therefrom on the same side of the hinge point as the handle. The first of the jaws has a surface for bearing against an inner portion of a watch case, while the opposite jaw has a stud extending substantially at right angles thereto and away from the first jaw whereby closure of the handles forces the stud transversely of the watch case against the portion of the push button interior of the watch case. Preferably, the stud has a recessed portion in the center part of the face which engages the push button so that the peripheral portion of the face bears against the sleeve or main body of the push button.

OBJECTS OF THE INVENTION

It is an object of the present invention to provide an inexpensive tool for extracting push buttons from watch cases.

It is a further object of the invention to provide a tool which will abut a portion of a watch case transversely opposite the push button to be removed and apply a pressing force outwardly against the push button.

It is another object of the present invention to provide a tool which engages a main structural portion of a push button without contact with delicate movable portions thereof.

It is another object of the present invention to provide a tool for removing push buttons from watches without damage to either the push button or the watch case while applying an ejecting force along a line sub-

stantially parallel to the axis of insertion of the push button.

It is yet another object of the present invention to provide a push button extracting tool having interchangeable push button-engaging members.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other objects of the invention may be better understood from the following description and accompanying drawings in which:

FIG. 1 is a side view of a preferred form of push button extractor according to the present invention;

FIG. 2 is a sectional view of a portion of FIG. 1 taken along the lines to two of FIG. 1; and

FIG. 3 is a side view of a modified version of the tool and including replaceable button-engaging tip.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

As shown in FIGS. 1 and 2, the preferred form of push button extractor of the present invention comprises a pair of handles 1 and 2 having hinged projections 3 and 4 extended towards each other to form a hinge with a hinge pin 5. The handles 1 and 2 have forward extensions or jaws 6 and 7, respectively, which extend on the same side of the axis of the hinge 5 as their respective handles.

The jaw 6 carries a stud 8 in a bore 9 which is generally perpendicular to the longitudinal axis of the tool and substantially at right angles to the axis of the hinge pin 5. As shown in FIG. 2, the stud 8 has a central recess 10 in its outer face 11 which forms an annular shoulder 12 for engaging the sleeve or main body portion of a push button. The stud 8 is secured in the jaw 6 by a threaded portion 13 engaging a threaded portion of the bore 9 and which preferably includes a hexagonal recess 14 for receiving an Allen wrench for driving the threaded portion into the bore. As shown, the stud is locked against rotation by means of a transverse set screw 15. It is to be understood, however, that any suitable means may be employed for mounting and locking the stud in the jaw.

The opposite jaw 7 carries a bearing or abutting surface 16 for engaging an inner portion of the watch case transversely across from the push button to be engaged by the stud 8. Preferably, the jaws 6 and 7 include cushion portions 17 and 18, respectively, which are formed of a relatively soft material such as rubber, plastic or nylon to avoid scratching or marring portions of the watch case.

Preferably, the handles 1 and 2 are biased away from each other by springs 19 which are secured by means of fasteners 20 and which abut each other at their forward ends 21. For convenience in manipulation of the tool during use, it is preferred that the springs 19 be mounted so that they can be swivelled out of an engagement by rotation about their fasteners 20.

In operation of the extractor of FIGS. 1 and 2, the forward positions of the jaws 6 and 7 are inserted in the watch case, the interfering contents of the watch case having been removed. The stud 8 is then placed against the innermost portion of the push button so that the shoulder 12 engages the sleeve or body of the push button and the handles are squeezed together carefully until the abutting surface 16 engages a portion of the watch case directly opposite the push button. With proper alignment of the stud and the abutting surface 16 with regard to the push button and the watch case, the

handles 1 and 2 are then squeezed further, thereby applying a press-out, ejecting force on the base of the push button substantially directly along the axis of insertion of the button in the case. Relatively delicate, central portions of the push button such as stems, switch components or the like are received freely in the recessed portion 10 out of contact with the remainder of the stud 8 so that they are protected from damage by the expelling force of the unit.

As shown in FIG. 3, a modified form of jaw 6' includes a projection 22 for engagement in a recess 23 in the forward portion 24 of the handle 1'. The jaw 6' carries a leaf spring 25 mounted thereon such as by means of a screw 26 which extends rearwardly and terminates in an L-shaped portion 26 which engages the shoulder 27 on the handle 1'. The jaw 6' also includes an inwardly formed stud 8' at its forward end, as well as a shielding cushion 17' for protecting the watch case.

With the interchangeable form of jaw shown in FIG. 3, it is possible to provide a plurality of quick-change jaws to accommodate various types of diameters of push buttons without substantial time loss in removing and replacing different size or dimension studs. It is to be understood that other forms of quick-change joints and connections for interchangeable jaws may be employed, if desired.

It is apparent that the present invention provides a particularly advantageous extractor for push buttons in wrist watches and pocket watches which applies a safe but adequate ejecting force against the body of the push button in the direction in which the push button is removed from its aperture in the watch case while simultaneously protecting both the watch case and the push button and its components from marring or damage.

Various changes may be made in the details of the invention as disclosed, without sacrificing the advantages thereof or departing from the scope of the attendant claims.

What is claimed is:

1. An extractor tool for extracting watch push buttons having a sleeve and delicate central portions such as stems and switch components, said tool comprising a pair of levers each including

a handle portion, and
a forward extension,
hinge means including a hinge intermediate said levers for separating said forward extensions when said handles are moved together,
a first of said forward extensions having a stud mounted thereon on an axis generally perpendicular to the longitudinal axis of the tool,
said stud having a pressing surface for engaging a push button,
said pressing surface including a central recessed portion for freely receiving said delicate, central portions of said push button and a peripheral shoulder for engaging the sleeve of the push button,
a shielding cushion surrounding the stud to protect a watch case with which the tool is used to extract a push button, and
the other of said forward extensions having a cushioned abutment end opposite the stud and positioned to bear against a portion of the watch case directly opposite the push button when said stud is positioned against the push button.

2. The extractor tool of claim 1 in which said stud is detachable.

3. The extractor tool of claim 2 in which said stud is threadably mounted in said forward extension.

4. The extractor tool of claim 2 in which a portion of said first forward extension is detachable and said stud is an integral part of said detachable portion of the forward extension.

5. The extractor tool of claim 4 in which said detachable portion of the forward extension is secured by a spring.

6. The extractor tool of claim 2 including at least one spring for biasing said handle portions away from each other.

7. The extractor tool of claim 6 in which said spring is mounted by a fastener allowing said spring to be swiveled out of engagement by rotation to an inoperative position.

8. The extractor tool of claim 7 wherein said first forward extension has a shielding cushion thereon through which the stud projects.

* * * * *

[54] IRIS RETRACTOR AND PUPIL DILATOR

[76] Inventor: Alan G. Schenk, 8149 W. Ogden Ave., Apt. 6, Lyons, Ill. 60534

[21] Appl. No.: 41,002

[22] Filed: May 18, 1979

[51] Int. Cl.³ A61B 17/02

[52] U.S. Cl. 128/20; 128/345

[58] Field of Search 128/341, 345, 20, 321, 128/354

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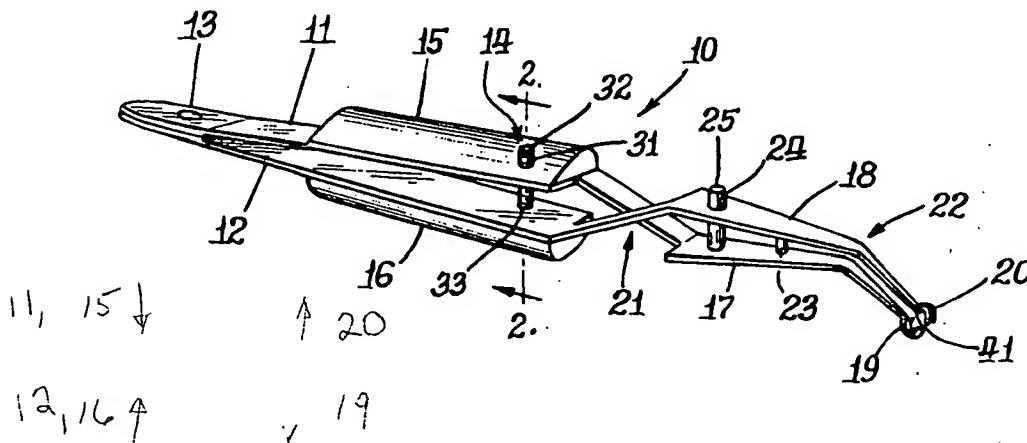
Primary Examiner—John D. Yasko

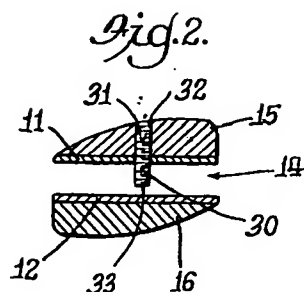
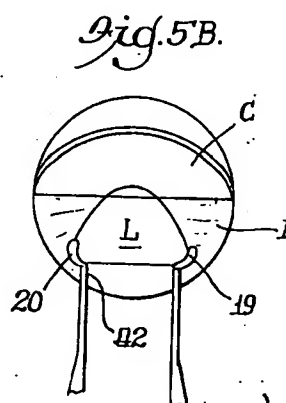
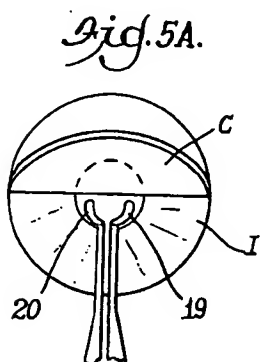
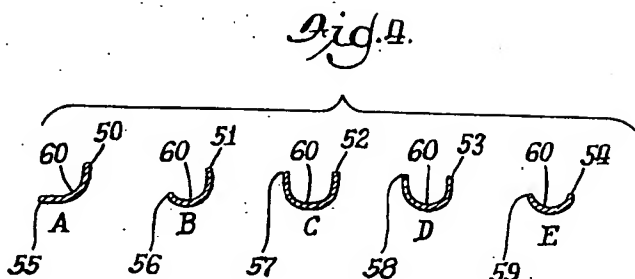
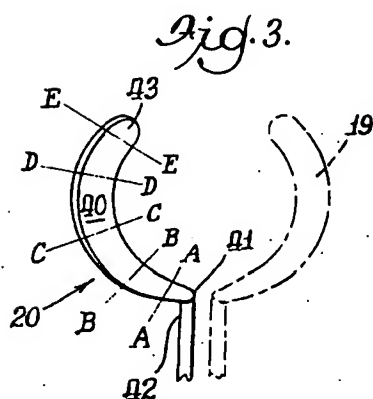
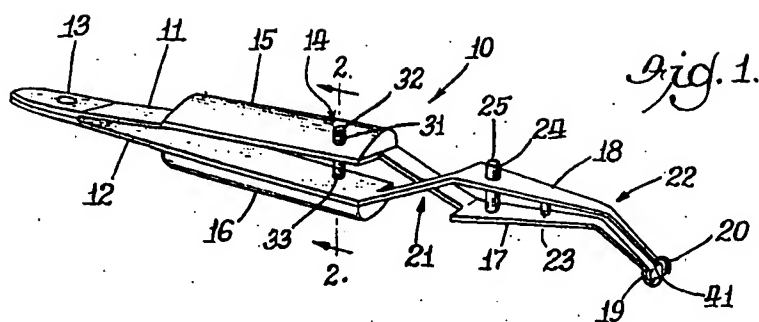
[57] ABSTRACT

An instrument for use in ophthalmic surgery to retract the iris and provide optimal dilation of the pupil in a facile, atraumatic, and thoroughly controllable fashion. The instrument includes a pair of curved retracting tips adapted to engage the iris gently and positively for expanding the pupil to permit removal of the crystalline lens without injury to the iris. The retracting tips are mounted on a pair of cross-action spring arms and the instrument is designed for easy comfortable one-hand operation.

8 Claims, 6 Drawing Figures

no ratchet





IRIS RETRACTOR AND PUPIL DILATOR

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to the field of surgery and more particularly to iris retracting instruments for use in ophthalmic surgery.

2. Description of the Prior Art

A number of instruments have been developed for use as iris retractors in ophthalmic surgery. These instruments generally are identified by the name of their developer and are commercially available. These include the iris retractors of Spivey, Bronson-Turtz, Rosenbaum-Drews, and Rizzuti. All of the above identified instruments are unitary hook or blade-type structures.

Such devices frequently have a number of disadvantages; for one, retraction of the iris is along one vector only, secondly they are frequently difficult to insert and remove; thirdly, they are generally unable to alter the attained pupillary size under different operative conditions; fourthly, they are generally unable to place simultaneous pressure during iris retraction on the posterior edge of the corneal wound to aid in expression of the lens; and fifthly, application at specific points of excessive force on the iris sphincter can damage this structure.

Another instrument designed for this purpose is the Eisner speculum. This speculum includes a pair of relatively large curved blades mounted on a tweezers-like structure that is outwardly spring-biased. The curved tips do not provide adequate positively engaging surfaces for engaging the iris nor is the outward movement or expansion of the tips limited except by the manipulation of the operator and the outermost spring expansion limit. The size of Eisner's tips or blades do not permit easy insertion into the pupil and they lack adequate iris grasping capability. The fact that the blades of Eisner fail to have a lower lip for engaging the iris requires that the surgeon maintain pressure with the instrument on the anterior surface of the lens. If this downward pressure is relaxed temporarily, one or more of the blades can be disengaged and the pupil collapsed at a critical time. In addition, Eisner's retracting blades have discrete front and back edges which can cause excess force to be exerted at discrete points on the iris sphincter and to cause injury at these points. The design of Eisner's handle makes it necessary for the surgeon to manipulate the instrument with his hand held in an uncomfortable and awkward mid-line position. In manipulating Eisner's instrument, the separation of the blades is achieved by relaxation of the grip pressure on the handle. Relaxation of this pressure also loosens the operator's grip on the instrument and makes precise manipulation difficult. The design of Eisner's blades prohibits the application of pressure on the posterior lip of the corneal incision so that pressure cannot be simultaneously exerted to facilitate lens expression and extraction. An instrument similar to the Eisner speculum but designed for use in performing spinal fusion is the Spreader Instrument of Peterson shown in Pat. No. 3,916,907.

A number of other instruments for use in eye surgery have also been described in the patent art. These include the patent to Saffa entitled "Speculum" U.S. Pat. No. 1,237,121 and the patent to Pulliam entitled "Eye Speculum" U.S. Pat. No. 2,438,646. Both of these inventions

are intended to be used for separating the eye lids of a patient and are not designed for retraction of the iris.

Additional patents specifically designed for use in iris retraction are the Surgical Device of Illig, U.S. Pat. No. 3,490,455 and the Ocular Surgical System of McReynolds, U.S. Pat. No. 4,037,589. The device of Illig is an iris engaging hook 12 and is designed to be sutured to the sclera of the eye. A considerable amount of time is involved in the placement and removal of the devices of Illig and, if used in conjunction with crystalline lens removal, may permit the escape of vitreous humor through the pupil because of the time delay involved in its removal from the eye.

The system of McReynolds employs a speculum frame for maintaining the eyelids apart and a plurality of wire hooks which engage the iris to separate the iris outwardly. As was true for the Illig device, the placement and removal of the hooks require an undue amount of time operative risk.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide an improved ophthalmic instrument which permits the ophthalmic surgeon to retract and dilate the iris of a patient in a comfortable and thoroughly controllable fashion. The instrument provides optimal dilation of the pupil in order that the crystalline lens of the patient can be engaged readily and without injury to the iris. The device further permits the application of varying degrees of pressure simultaneously on the posterior edge of the corneal incision thereby forming a pupil of the most desired shape and size for permitting lens removal therethrough.

It is a more particular object to provide an ophthalmic instrument in the general form of a cross-action type of tweezers carrying a pair of iris retracting tips on its forward most limits. The device has two handles which are compressed together for separating the iris retracting tips and thereby retracting the iris and dilating the iris. The device also includes an adjustable stop mechanism disposed between the handles for adjusting the maximum limit of separation of the iris retracting tips.

The retracting tips are generally lunar shaped and are progressively curved in cross-section for sequentially engaging and expanding the margin of the iris.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the improved iris retractor of the present invention;

FIG. 2 is an enlarged perspective view of the adjustable stop mechanism for the instrument of FIG. 1;

FIG. 3 is an enlarged plan view of the iris retracting tips carried by the instrument of FIG. 1;

FIGS. 4A, B, C, D and E are cross-sectional views of one of the retracting tips taken on lines A—A, B—B, C—C, D—D, and E—E of FIG. 3;

FIG. 5A is a view of the iris retracting tips as intended to be used to engage the iris of a patient; and

FIG. 5B is a view of the iris fully retracted and dilated.

BRIEF DESCRIPTION OF THE PREFERRED EMBODIMENT

The iris retractor of the present invention is illustrated in FIG. 1 and designated generally by the numeral 10. The retractor 10 comprises a pair of elongated leaf spring members 11 and 12 which are joined at 13 to

form a unitary structure. An adjustable stop mechanism 14 is mounted between the spring members 11 and 12. Knurled eccentric handle portions 15 and 16 are mounted on the outer surfaces of the spring members 11 and 12, respectively. Elongated extensions 17 and 18 of the spring members 11 and 12, respectively, each carry an iris retracting tip 19 and 20, respectively at their outermost limits. The extensions 17 and 18 form a cross-action mechanism at 21 and are curved at 22 to permit easy insertion of the retracting tips into the eye of a patient. The tips 19 and 20 have a low profile relative to and perpendicular to the margin of the iris. A fixed stop 23 is mounted on one of the extensions 17 or 18 and abuts against the other extension and prevents the retracting tips 19 and 20 from forcefully coming into contact with each other. The upper extension 18 is formed with a circular aperture at 24 and an aligning pin 25 is mounted on and perpendicular to the extension 17 and extends longitudinally through the aperture 24.

The handles 15 and 16 are eccentrically curved as shown in FIG. 1 and FIG. 2 and are formed with a knurled outer surface to permit easy engagement by the manipulating hand. The eccentric curvature of each of the handles of 15 and 16 is such that the center of curvature is displaced substantially off-center of a plane perpendicular to the long axis of each spring member 11 and 12, and for each member in a direction opposite to that of the other member. This configuration permits the grasping hand to provide an obliquely oriented squeezing force to the instrument without the surgeon's hand or body being uncomfortably positioned. The aligning pin 25 maintains accurate alignment of the retracting tips 19 and 20 despite oblique forces exerted on the handle surfaces.

The adjustable stop mechanism 14 is illustrated in greater detail in FIG. 2. The stop 14 comprises a machine screw 30 formed with a slotted head 31 threaded through an aperture 32. The screw 30 is formed with fine gauge threads on its exterior and is mounted within the correspondingly threaded bore 32 formed in the handle 11.

The outward expansion of the retracting tips 19 and 20 is controlled and limited by the adjustment of the screw 30 of stop mechanism 14. This outward limit is established by the compression of the leaf spring 12 against the end 33 of the screw 30. Referring now to FIGS. 3 and 4, the retracting tips 19 and 20 are illustrated in greater detail. The cross-sectional views taken in FIG. 3 and shown in FIG. 4 are illustrated only for the tip 20, although it is to be understood that the retracting tip 19 is a mirror image of the tip 20. The retracting tip 20 comprises a unitary body portion 40 that may be defined in terms of primary and secondary curves. The primary curve is generally in the form of an outwardly convex lunar shaped arc of gradually decreasing radii of curvature from its point of attachment to the handle extension 18. The lunar arc corresponds generally to the configuration which the pupillary margin will take upon retraction of the iris. The rearmost aspect 41 of the body portion 40 is attached to the narrowed end of the extension 18 and a tangent to the primary curve at that point is perpendicular to a mid-line plane of the instrument and is also precisely aligned with the other retracting tip 19. The lower surface of the extension 18 defines a heel 42 adapted to contact the posterior lip of a corneal incision. The most forward aspect 43 of the primary curve of the body 40 has the greatest curvature. This variable curvature assures that

no concentration of the dilating forces on the iris is asserted by the tips 19 and 20 might occur despite differences in the possible maximal dilations as established by the adjustable stop mechanism 14.

The secondary curves defining the configuration of the tip 20 are generally concave and perpendicular to the primary curve as illustrated in greater detail in FIG. 4. The sectional views are taken along lines A—A, B—B, C—C, D—D, and E—E of FIG. 3. The sectional views are shown to progress from a generally reversed L configuration at A to a U configuration at C and D and to a shallow U configuration at E. The sectional views may be defined in terms of upper lid indicia as shown at 50, 51, 52, 53, and 54 for the views A through E respectively. Similarly, the lower lips may be defined by indicia 55, 56, 57, 58, and 59 respectively for the corresponding sections. The upper lip indicia 50—54 are those portions which curve above the pupillary margin during use of the instrument and the lower lip portions 55—59 are those which curve beneath and under the pupillary margin. A generally concave iris contacting surface 60 is defined between the upper and lower lips. A virtual absence of a lower lip at 55 and 56 of the sections A and B respectively, allows for ease of insertion and removal of the instrument and for engaging the pupillary margin as will be described hereinafter.

In operation, the instrument 10 shown in FIG. 1 is designed for left hand operation, and would be a mirror image of a corresponding right handed model (not shown). The handles 15 and 16 are grasped and manipulated with the left hand and the operation may be understood most clearly by reference to the illustrations shown in FIGS. 5A and 5B.

After the cornea C has been incised and folded back upon itself as shown in FIG. 5A, the retracting tips 19 and 20 are introduced into the pupil of the iris I. A gentle downward pressure and slight backward tilting of the instrument 10 causes the lower lips 55 and 56 to engage the margin of the iris mid-line which then comes to be positioned beneath the upper lips 50 and 51 (and corresponding lips for the tip 19). The engagement of the margin of the iris which is now just off mid-line, and by virtue of the supple structure of the iris itself, guides and produces a natural rolling tendency of the iris I. The margin of the iris engaged by the surface 60 follows the mid-line, as does the remainder of the pupillary margin, so that the iris once started in effect rolls itself over the lower lips 55 and 56 of the tip 20 and in essence is captured and positions itself between the upper and lower lips. The instrument is then drawn backwards toward the surgeon at the same time squeezing pressure is applied to the handles 15 and 16 causing the retracting tips 19 and 20 to separate from each other. The pupil is then dilated as shown in FIG. 5B to a degree predetermined by the adjustable stop 14. The iris I retracted backwards as shown in FIG. 5B provides optimal exposure of the underlying lens L. During removal of the lens L through the dilated pupil, optimal pressure is simultaneously exerted by the heel 42 of the instrument on the posterior edge of the wound so as to depress the wound edge and cause the wound to gape. This slight positive pressure on the eye also facilitates lens expression and extrusion. Following extraction of the lens, removal of the instrument 10 is accomplished in a manner reversed to that of its insertion. Pressure on the posterior edge of the wound is relieved, the instrument is advanced forwardly away from the surgeon, and at the same time relaxing of the squeezing pressure on the

handles 15 and 16 allows the tips 19 and 20 to come together. The instrument 10 is then tilted slightly forwardly to allow the iris to roll off the lower lips of the tips 19 and 20 and become disengaged therefrom.

In summary, the instrument 10 permits the ophthalmic surgeon to retract the iris I in a manner which causes the least trauma to the iris. In addition, because of the optimal retraction, the greatest protection to the iris is afforded from other instruments used to extract the lens. The construction of the handles 15 and 16, with their eccentrically curved surfaces, permits the operator to exert squeezing forces which are comfortable and normal to the hand. The aligning pin 25 retins precise alignment of the members 17 and 18 despite the obliquity of those forces. The cross-action mechanism 21 in conjunction with the two dilating tips 19 and 20 allows a firmer and more controlled grasp of the instrument 10 than can be had with instruments such as Eisner's speculum. The adjustable stop mechanism 14 permits the individual surgeon to pre-set that amount of attainable dilation which he or she believes will be safe without causing overextension of the iris sphincter or other trauma to the iris I. The heel 42 of the instrument 10 allows pressure to be placed on the posterior edge of the wound during retraction of the iris I. This pressure causes the wound to gape and provides positive vitreous pressure as needed to aid in the expression and extraction of the lens L.

The design of the retracting tips 19 and 20, particularly because of their secondary curve configuration, allows for easy insertion into the pupil as well as withdrawal from the pupil but does otherwise engage the iris positively during retractions and dilations. The low profile of the retracting tips 19 and 20 perpendicular to their plane of separation permits insertion of the instrument into a pupil of small size without the need to forcefully fold the cornea back upon itself excessively. In addition, the retracting tips 19 and 20, because of the design of their primary curve, place no undue force at any one point on the pupillary margin and thereby avoids trauma to the iris sphincter. The continuously variable degree of separation of the tips 19 and 20, limited only by the fixed stop 23 and adjustable stop 14, permits the surgeon to vary continuously, as needed, the degree of separation as is deemed optimal from moment to moment during the procedure.

The embodiment of the invention shown and described is the preferred one but it is to be understood that any one or several of the features described might be changed without departing from the spirit of the invention. For example, the instrument could be constructed with flat surfaced handles instead of the eccentric handles described so that the instrument could be used in either hand. Similarly, the cross-action mechanism could be omitted and the separation of retraction tips accomplished by spring bias by the member itself. However, as explained above, such mode of operation is not preferred, but could be employed without detracting from the utilitarian function of the retracting tips 19 and 20.

It is to be understood that the embodiment of the invention shown and described is by way of example

only and many changes may be made thereto without departing from the spirit of the invention. The invention is not to be considered as limited to the embodiment shown except insofar as the claims may be so limited.

I claim:

1. An instrument adapted for use in ophthalmic surgery comprising:

a pair of outwardly convex curved iris retracting and pupil dilating tips adapted to be mutually separated in a plane defining a plane of motion;

curved lip means formed on upper and lower edges of each of said tips and joined by an inwardly concave external surface adapted to capture and retain the margin of an iris lying within said defined plane as said tips are increasingly separated and retracted; and

handle means attached to said tips for effecting mutual separation thereof.

2. The instrument of claim 1 wherein:

each of said tips comprises an outwardly convex curved body portion having radii of curvature lying in said defined plane and characterized by progressively decreasing radii from a point of attachment on said handle means to an outermost remote point.

3. The instrument of claim 1 wherein:

said concave surface lies generally perpendicular to said defined plane and extends along an outer periphery of said curved tips.

4. The instrument of claim 3 wherein:

said lower lip means are diminished adjacent the point of attachment to said handle means to facilitate ease of insertion of said lower lips into the pupil of an eye and removal therefrom.

5. The instrument of claim 4 wherein:

said lower lip means gradually increase in dimension at distances more remote from said point of attachment attaining a dimension substantially equivalent to that of said upper lip means, whereby the pupillary margin of a eye is increasingly engaged for retraction.

6. The instrument of claim 4 wherein:

said concave surfaces on each tip adjacent said point of attachment lie substantially on a common tangent in said plane of motion when said tips are at their point of minimum separation so as to minimize point of contact forces on the pupillary margin during dilation.

7. The instrument of claim 1 including:

adjustable stop means mounted on said handle means and operable to adjust and limit the separation of said tips.

8. The instrument of claim 1 wherein:

said handle means includes a separate handle for each tip with each handle having longitudinal dimension and significantly curved outer surfaces transverse to said longitudinal dimension with radii of curvature generally perpendicular to said longitudinal dimension, and with centers of curvature of each handle laterally displaced in a direction opposite to that of the other handle.

* * * * *

United States Patent [19]

Cox

[11] Patent Number: 4,754,746

[45] Date of Patent: Jul. 5, 1988

[54] SELF-RETAINING METATARSAL SPREADER

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[21] Appl. No.: 911,570

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[51] Int. Cl.⁴ A61B 17/02

[52] U.S. Cl. 128/20; 128/17; 81/302

[58] Field of Search 128/17, 19, 20, 81, 128/18, 84 R, 89 R, 321, 322, 346, 303 R; 81/302; 29/239; 433/7, 157, 159, 148, 149

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Primary Examiner—Richard C. Pinkham

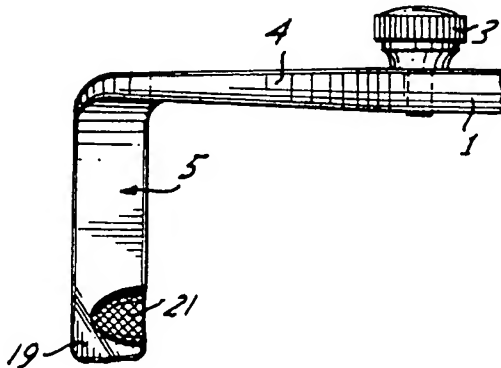
Assistant Examiner—Mark S. Graham

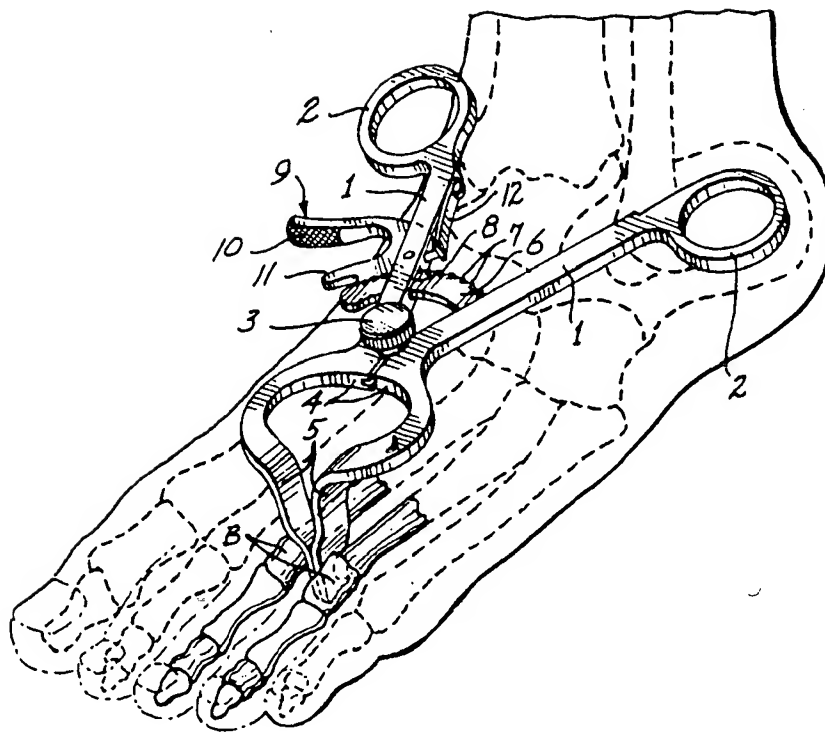
Attorney, Agent, or Firm—Ward Brown; Robert W. Beach

[57] ABSTRACT

Opposing jaws of a retractor are pivoted together and extend oppositely from handles manually swingable to move the jaws relatively toward and away from each other. Generally rectangular blades extend downward from the swinging ends of the jaws and have planar leading bottom portions contiguously engageable for fitting between closely adjacent bone such as metatarsals. The trailing portions of the blades are flared outward and rearward from the planar contiguously engageable portions for wedging the adjacent bones apart and have concave depressions for receiving the bones. With the bones received in the concave depressions, the jaws are swung apart to spread the bones and maintain them in spread-apart condition for convenient access to the facing surfaces of the bones, such as to excise a neuroma.

4 Claims, 2 Drawing Sheets



*Fig. 1.*

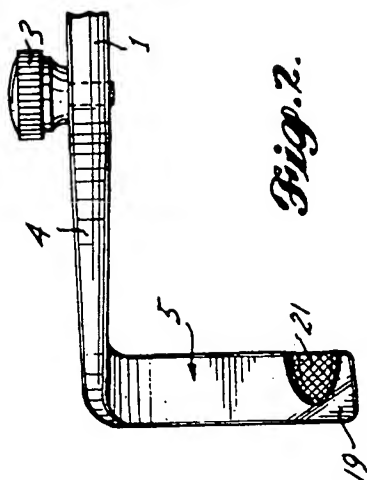


Fig. 2.

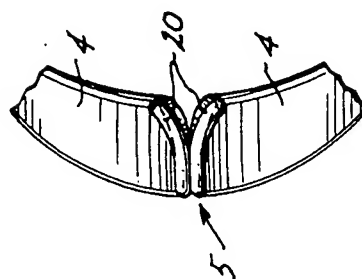


Fig. 3.

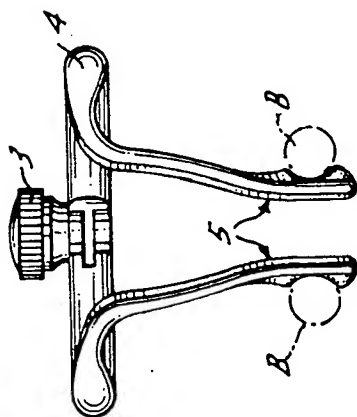


Fig. 6.

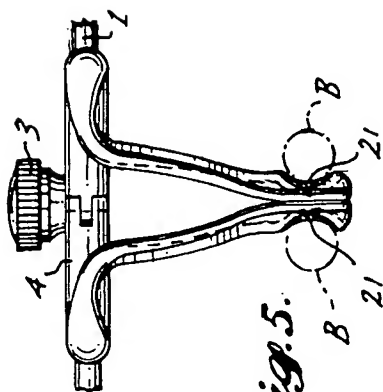


Fig. 5.

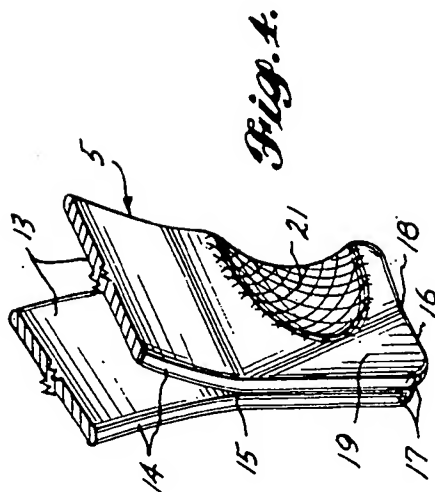


Fig. 4.

SELF-RETAINING METATARSAL SPREADER

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a medical instrument for spreading apart adjacent body parts of a patient during surgery. The disclosed embodiment is specifically designed for spreading apart and maintaining in spread-apart condition adjacent metatarsals for convenient access by a foot surgeon.

2. Prior Art

A fairly common affliction of the foot is development of a painful neuroma close to or between the heads of adjacent metatarsals, such as along the third common digital nerve in the area of the transverse metatarsal ligament where such nerve curves plantarward. Treatment can be by surgical excision of the neuroma. It is important to excise the neuroma completely, but access to the affected area can be limited by the closely spaced bones and the ligament itself.

There is no known instrument designed specifically for spreading apart and retaining in spread-apart condition the adjacent metatarsals, but instruments designed primarily for other purposes have been used. Retractors having long handles and more or less hooked ends can be fitted between the adjacent bones and pulled apart manually by a surgical assistant. Clever surgeons have tried flattening the blades of known retractors with pivoted opposing jaws, but the flattened blades can be difficult to insert between the metatarsals and can slip or even pop out from between the bones.

SUMMARY OF THE INVENTION

The principal object of the present invention is to provide a medical instrument effective for spreading apart and maintaining in spread-apart condition adjacent bones of a patient, particularly adjacent metatarsals, enabling access to the opposing faces for excision of a neuroma, which instrument is of simple, inexpensive construction and easy to use, and which will reliably maintain the bones in spread-apart condition without requiring additional attention of the surgeon or a surgical assistant.

In the preferred embodiment of the present invention, the foregoing object is accomplished by a pivoted retractor of generally conventional construction in that the retractor has the usual pivoted handles and jaws with manually releasable ratchet mechanism for normally maintaining downward-projecting blades in progressively greater spread-apart positions as the handles are squeezed together, but with blades of novel design. In the preferred embodiment, the blades have flat, contiguously engaged, lower forward corner portions such that, with the instrument inclined downward and forward, such tips will fit easily between adjacent bones. The lower rear portions of the blades are flared outward so that, as the instrument is subsequently moved to a horizontal position, the adjacent bones are wedged apart slightly until they fit in concave depressions at the trailing edge portions of the blades. The bones are reliably maintained in the depressions as the jaws of the instrument are spread apart.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a somewhat diagrammatic top perspective of a self-retaining metatarsal spreader in accordance with the present invention, showing the foot of a patient

partially in phantom with the downward-projecting blades of the spreader inserted between adjacent metatarsals.

FIG. 2 is a fragmentary side elevation of the leading end portion of the self-retaining metatarsal spreader shown in FIG. 1, on a larger scale.

FIG. 3 is a fragmentary bottom plan of the leading end portion of the self-retaining metatarsal spreader of FIG. 1, on a larger scale than FIG. 2.

FIG. 4 is a fragmentary top perspective of the bottom portions of the blades of the self-retaining metatarsal spreader of FIG. 1, on a still larger scale.

FIGS. 5 and 6 are corresponding front end elevations of the self-retaining metatarsal spreader of FIG. 1 with parts in different positions, on the same scale as FIG. 2 and with the spreader handles deleted.

DETAILED DESCRIPTION

As shown in FIG. 1, the self-retaining metatarsal spreader in accordance with the present invention resembles a conventional pivoted retractor with opposing elongated handles 1. Each elongated handle has an end finger ring 2. The handles are connected by the central pivot pin or screw 3. Integral with the handles are opposing arcuate jaws 4 preferably coplanar with the long and straight handles 1. The bone-spreading blades 5, described in detail below, extend downward from the leading or distal ends of the jaws 4.

An arcuate ratchet segment 6 with closely spaced teeth 7 extends inward from one of the handles 1 through a slot 8 in the other handle. Such segment cooperates with a pawl member 9 pivotally mounted in another slot through such other handle closely adjacent to the slot 8. The pawl member has teeth complementary to the ratchet segment teeth 7. The pawl member has an outward-projecting actuating finger 10 and, preferably, another finger 11 spaced forward from finger 10 to protect the finger of the user from cutting or pinching engagement against the ratchet teeth 7, similar to the instrument described in U.S. Pat. No. 3,038,467. A cantilever leaf spring 12 extends along the inner side of the same handle to which the pawl mechanism 9 is pivoted. Preferably, the leaf spring cooperates with an inner arcuate abutment or cam of the pawl member in over center manner to bias the pawl member to the engaged position shown in FIG. 1 or optionally retain it in a released, disengaged position.

In the position shown in FIG. 1, squeezing the handles 1 together results in spreading the jaws 4 and their blades 5 apart so as to spread the metatarsals B between which the blades 5 are inserted. This permits convenient access to the facing sides of the metatarsals, such as to excise a neuroma. Even greater access is accomplished by the arcuate shape of each jaw 4 which leaves the wide, generally circular area between the facing sides of the jaws, so as not to obstruct access to the bones.

As seen in FIG. 2, in profile each blade 5 is generally rectangular, of substantially uniform width from top to bottom. With reference to FIG. 4, the upper portions 13 of the blades are inclined downward and inward toward each other until the leading edges 14 of the blades meet at a point 15 approximately one-quarter to one-third of the total length of each blade from the blade bottoms 16. From such meeting point 15 the thin leading edges 14 of the blades are in substantially contiguous engagement down to the rounded lower forward corners 17. From such corners, the blade bottom edges remain in substan-

tial contiguous engagement to a point 18 at about the midpoint of the width of the blades. As illustrated by the shading of FIGS. 2 and 4, each blade has a planar lower forward corner portion 19 of generally right-triangular shape, contiguously engageable against the corresponding lower forward corner portion of the other blade. Consequently, with the spreader handles and jaws tilted downward and forward, such corner portions 19 can be easily fitted between even closely adjacent bones.

As seen in FIGS. 3 and 4, from the planar, contiguously engageable corner portions 19, the blades 5 are flared apart rearward, that is, as seen in FIG. 3, the trailing portion 20 of the lower portion of each blade is gently curved outward to its rear edge. In the flared trailing portion 20 of each blade, a concave depression 21 is formed immediately behind the planar lower forward portion 19. The bases or center lines of the depressions extend horizontally and, in the closed positions of the blades, the bases or center lines are flared slightly rearward.

After tilting of the spreader and insertion of the contiguously engaged lower forward portions 19 between adjacent bones, the spreader can be swung back toward a horizontal position while maintaining downward pressure so that the flared trailing portions of the blades fit between bones or gently wedge them apart. The bones B will fit in the depressions 21 as seen, for example, in FIG. 5. FIG. 6 shows a slightly exaggerated spread-apart position of the bones. It will be noted that, with the blades 5 in the desired spread-apart positions, the bases of the depressions are substantially parallel, whereas the flat lower forward corner portions of the blades are flared forward and outward slightly. At any rate, the bones are reliably retained in the concave depressions 21 which preferably have criss-crossed grooves or ribs to bite into tissue surrounding the bones and thereby prevent slippage.

In the preferred embodiment, each blade can be formed from stainless steel stock and be about 32 millimeters high by about 8 millimeters wide and about 2 millimeters thick. Consequently, the double-blade thickness of the contiguously engaged lower forward portions 19 presented between adjacent bones is only about 4 millimeters. The trailing portion of each blade can flare outward about 5 to 8 millimeters and each depression 21 should be at least 2 millimeters deep, preferably about 3 millimeters deep. The center lines of the depressions can be spaced upward from the blade bottoms about 5 millimeters.

Preferably the generally right triangular planar portions 19 of the blades have perpendicular base edges at least about 4 millimeters long for easy retention of such portions between closely adjacent bones as the spreader is tilted toward a horizontal position while wedging such bones apart.

In an adult patient, the handles 1 rest conveniently on the top of the patient's foot unobtrusively, making it less likely that the blades will be dislodged by the surgeon or an assistant during surgery.

I claim:

1. Mechanism for spreading apart adjacent bones of a patient comprising a pair of adjacent upright blades each having respective leading and trailing bottom portions, said leading bottom portions of said blades being planar and contiguously engageable for fitting between the adjacent bones and said trailing bottom portions of said blades including portions flared relatively outward

and rearward from said leading bottom portions, at least one of said blades having a depression in its flared trailing portion, the greatest depth of said depression being spaced upward from the bottom edge of its blade and said depression forming an outturned projection at the bottom of such blade below the greatest depth of said depression for receiving and holding one of the adjacent bones, and means for moving said blades relatively apart so as to spread apart said bones when said blades are fitted between said bones with one of said bones received in said depression.

2. Mechanism for spreading apart adjacent, generally parallel, horizontal metatarsals of a patient comprising a pivoted retractor having opposing horizontal jaws and generally rectangular blades extending downward from corresponding swinging ends of said jaws, said blades having respective top and bottom portions and respective leading and trailing portions, the leading bottom corner portions of said blades being planar and contiguously engageable for fitting between the adjacent metatarsals with said blades tilted relative to said metatarsals, the trailing bottom portions of said blades being flared outward from their respective leading forward portions, said planar leading bottom corner portions of said blades being of generally right-triangular shape including perpendicular base edges along the leading and bottom edges of the blade, respectively, each of said trailing bottom portions of said blades having a concave depression for receiving the convex adjacent side of the adjacent metatarsal when said blades are fitted between said metatarsals, and means for moving said jaws so as to move said blades relatively apart while said adjacent metatarsals are received in said depressions.

3. Mechanism for spreading apart adjacent, generally parallel, horizontal metatarsals of a patient comprising a pivoted retractor having opposing horizontal jaws and generally rectangular blades extending downward from corresponding swinging edges of said jaws, said blades having respective top and bottom portions and respective leading and trailing portions, the leading bottom corner portions of said blades being planar and contiguously engageable for fitting between the adjacent metatarsals with said blades tilted relative to said metatarsals, the trailing bottom portions of said blades being flared outward from their respective planar leading forward portions, each of said trailing bottom portions of said blades having a concave depression for receiving the convex adjacent side of the adjacent metatarsal when said blades are fitted between said metatarsals, said depression forming an outturned projection at the bottom of such blade below the greatest depth of said depression each of said depressions having a center line about which such depression is substantially symmetrical and said center lines of said depressions being coplanar and flared outward and rearward relative to each other when the blades have their planar leading bottom corner portions engaged.

4. Mechanism for spreading apart adjacent, generally parallel, horizontal metatarsals of a patient comprising a pivoted retractor having opposing horizontal jaws and generally rectangular blades extending downward from corresponding swinging ends of said jaws, said blades having respective top and bottom portions and respective leading and trailing portions, the leading bottom corner portions of said blades being planar and contiguously engageable for fitting between the adjacent metatarsals with said blades tilted relative to said metatarsals, the bottom edge of said planar leading bottom corner

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portion of each blade extending rearward to about midway between the leading and trailing edges of such blade and the trailing bottom portions of said blades being flared outward from their respective planar leading forward portions from about midway between the leading and trailing ends of said blades, each of said trailing bottom portions of said blades having a concave depression for receiving the convex adjacent side of the adjacent metatarsal when said blades are fitted between

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said metatarsals, the greatest depth of each of said depression being spaced upward from the bottom of its blade forming an outturned projection at the bottom of such blade below the greatest depth of said depression, and means for moving said jaws so as to move said blades relatively apart while said adjacent metatarsals are received in said depressions.

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US006116124A

United States Patent [19]

Ping

[11] Patent Number: 6,116,124

[45] Date of Patent: Sep. 12, 2000

[54] ADJUSTABLE PLIERS

[75] Inventor: Qiu Jian Ping, Hangzhou, China

[73] Assignee: Great Neck Saw Manufacturers, Inc.,
Mincola, N.Y.

[21] Appl. No.: 09/339,451

[22] Filed: Jun. 24, 1999

4,893,530 1/1990 Warheit 81/409.5
5,408,904 4/1995 Neff 81/360

FOREIGN PATENT DOCUMENTS

916413 1/1963 United Kingdom 81/324

Primary Examiner—James G. Smith
Attorney, Agent, or Firm—Joseph J. Previto

[57] ABSTRACT

Adjustable pliers having a pair of handles, each handle having a jaw portion, an intermediate portion and a hand-grip portion. The handles intersect each other and are pivotally mounted to each other so that movement of the hand-grip portions in one direction will move the jaw portions in the same direction. Holding means in the form of a pin extends from one of the intermediate portions and a slot is in the other intermediate portion. The holding pin extends into the slot and is slidable along the slot. The slot has receiving means in the form of notches which will receive the said holding pin when the jaw portions are placed in a predetermined position and hold them in that position. A locking assembly is also provided on the handle members to lock the two in position.

Related U.S. Application Data

[63] Continuation of application No. 08/909,645, Aug. 12, 1997.

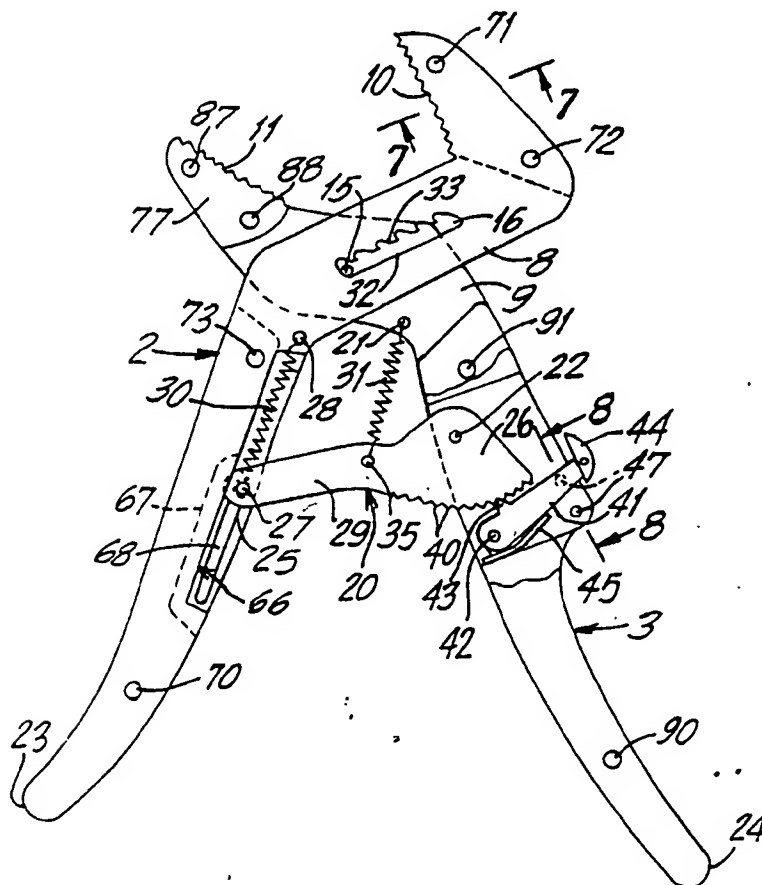
[51] Int. Cl.⁷ B25B 7/04[52] U.S. Cl. 81/385; 81/319; 81/325;
81/337; 81/409.5; 81/411[58] Field of Search 81/318, 319, 325,
81/336, 337, 348, 352, 355, 358, 405, 407,
408, 409, 409.5, 411, 385

[56] References Cited

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1,651,216 11/1927 McGill .
4,802,390 2/1989 Warheit 81/407 X

10 Claims, 4 Drawing Sheets



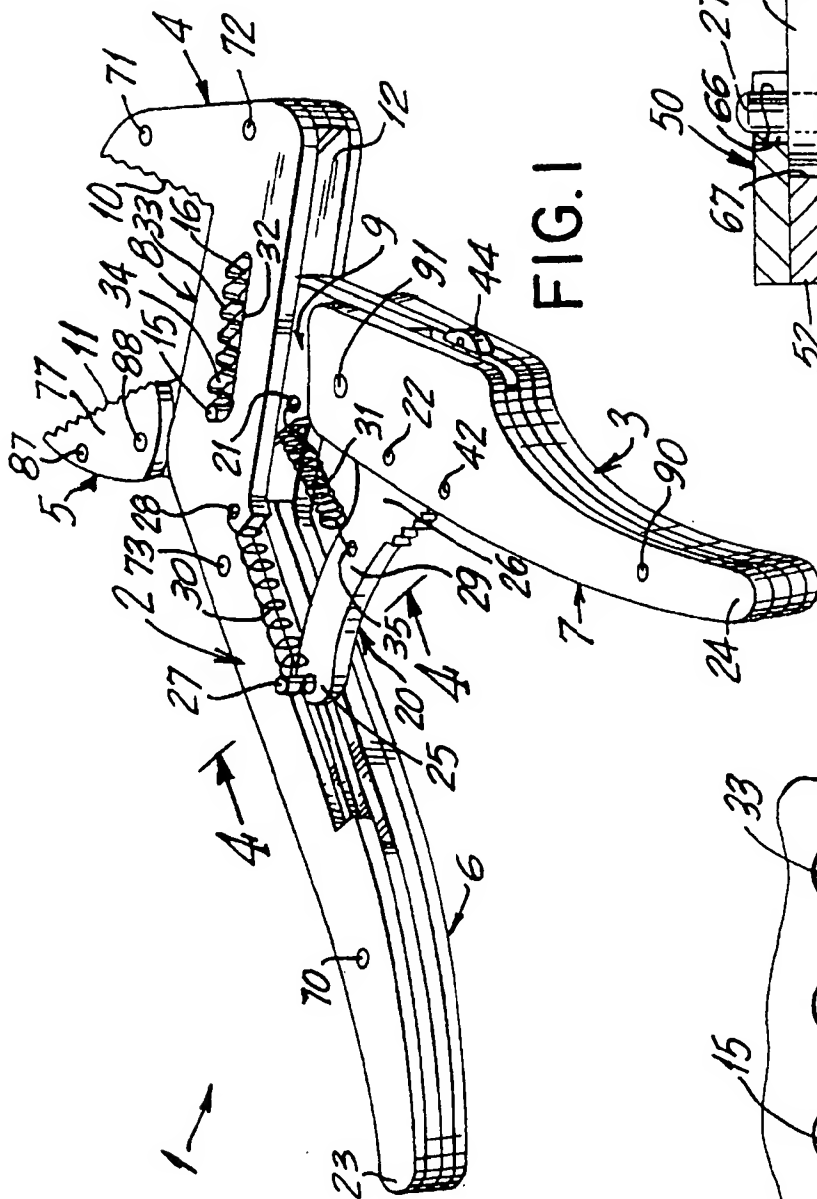


FIG. 1

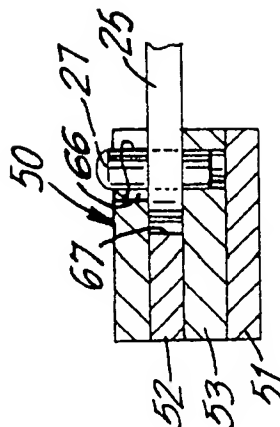


FIG. 4

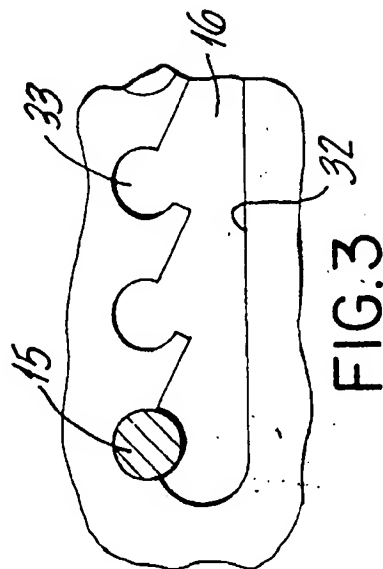


FIG. 3

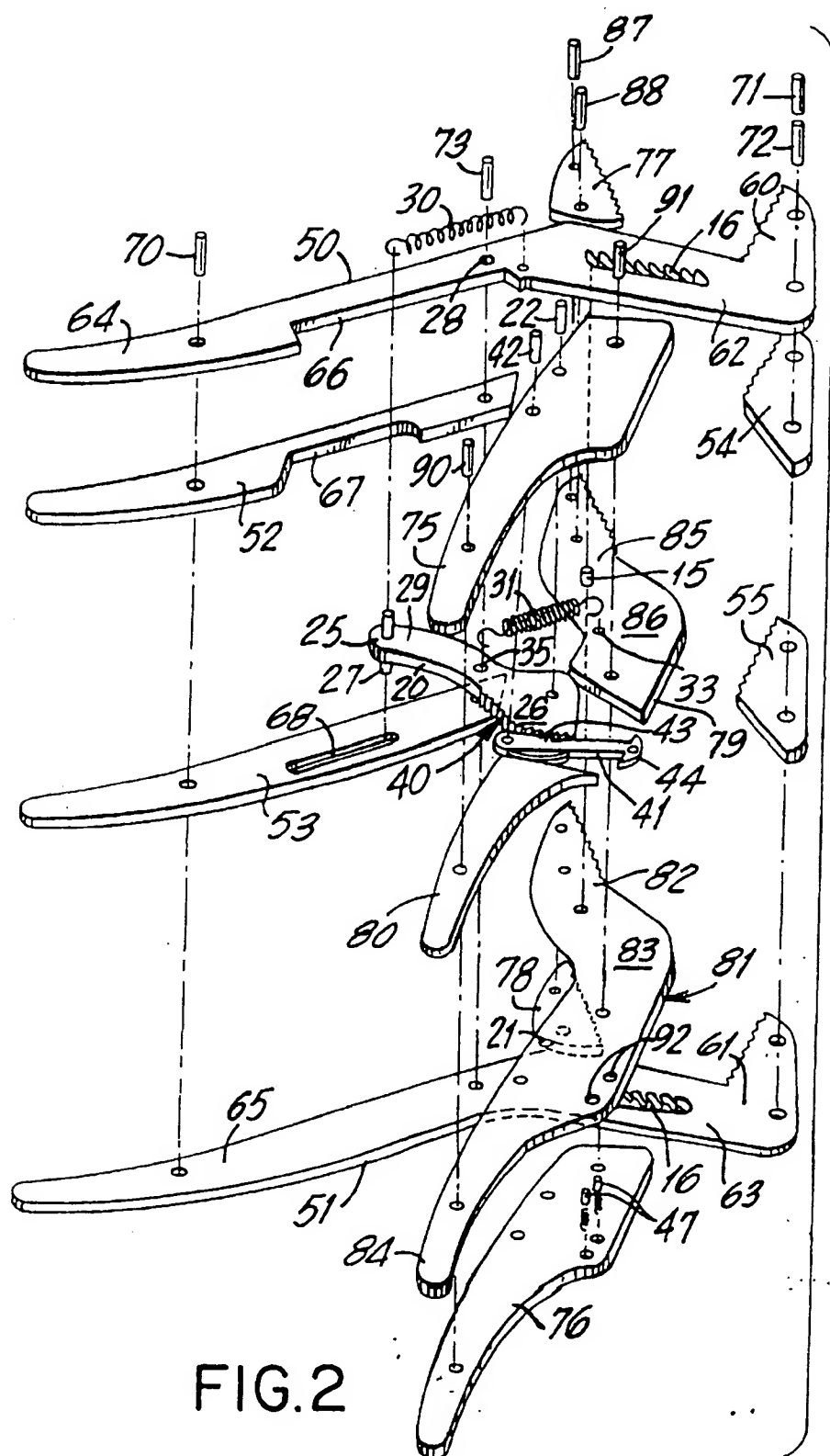
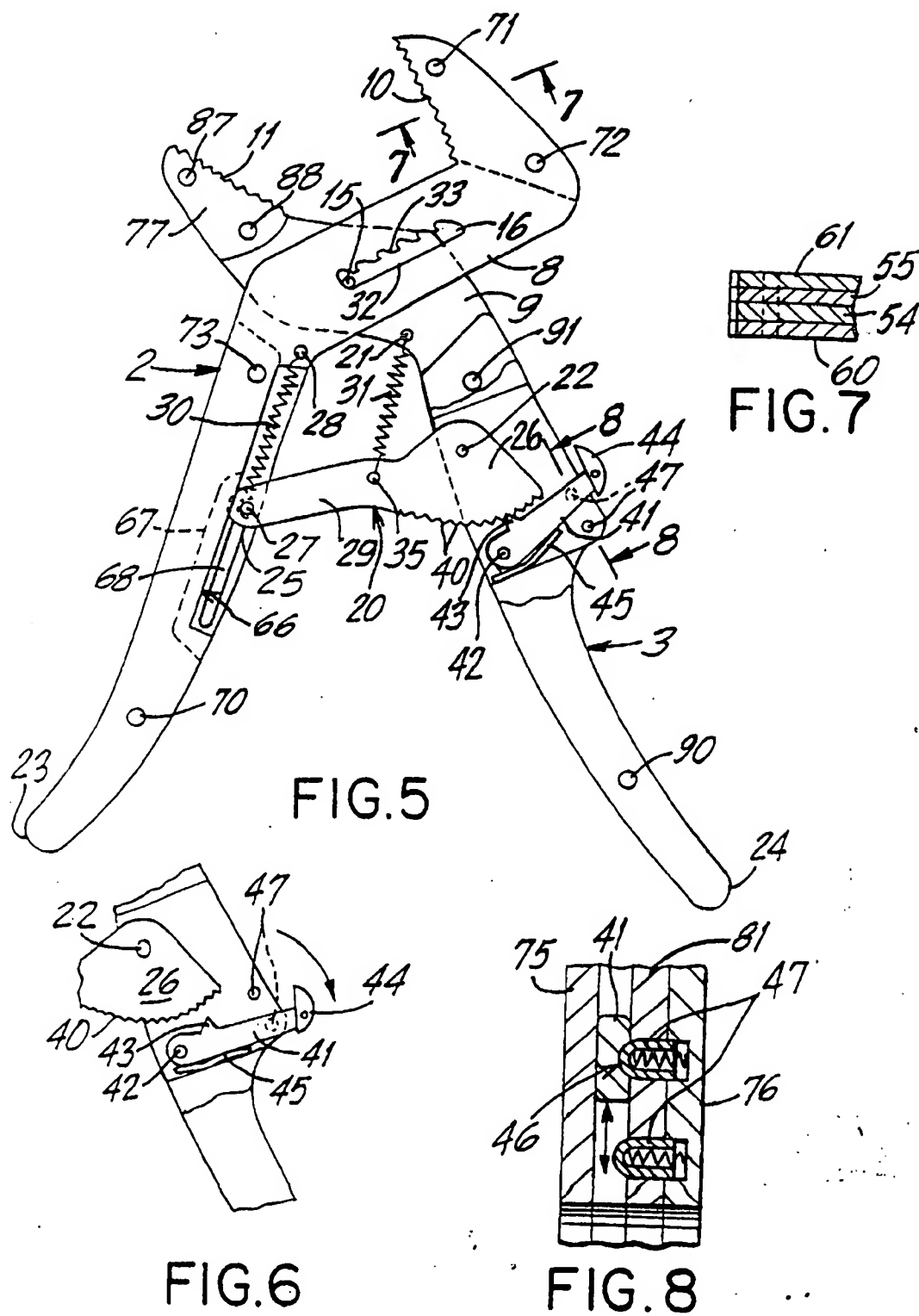
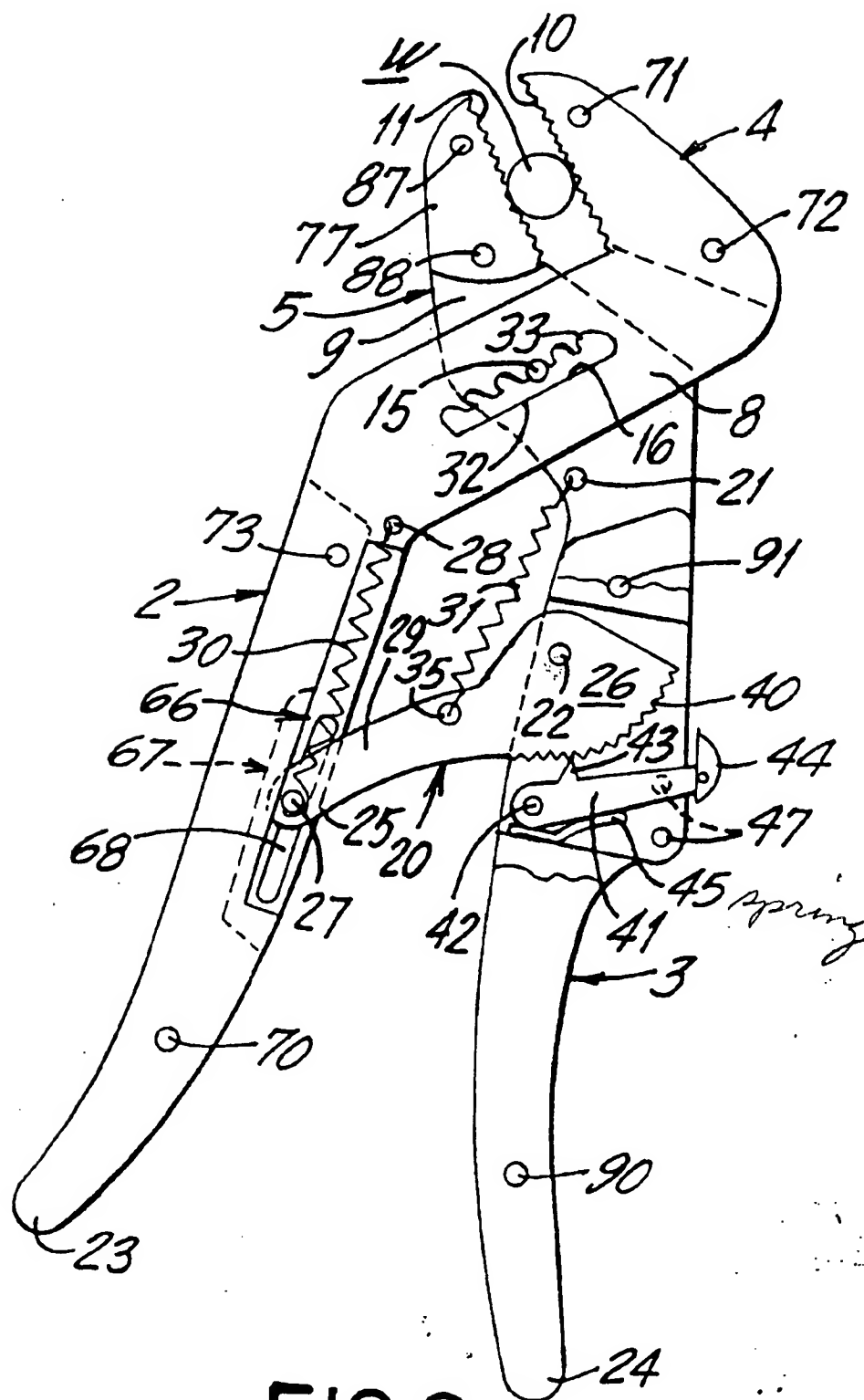


FIG. 2





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ADJUSTABLE PLIERS

This application is a continuation of pending U.S. patent application Ser. No. 08/909,645 filed Aug. 12, 1997.

BACKGROUND

The present invention relates to adjustable pliers and more particularly to adjustable pliers which are adapted to be locked in a particular position.

A number of patents have issued on adjustable pliers. Applicant is aware of at least the following patents relating to adjustable pliers: U.S. Pat. Nos.

4,651,598
4,893,530
5,351,584
4,802,390
4,662,252
5,060,543

OBJECTS

The present invention is an improvement over adjustable pliers that have been used in the past and has for one of its objects the provision of an improved adjustable pliers which is capable of being easily locked in place around a work piece.

Another object of the present invention is the provision of an adjustable plier which can be locked in any position with one hand and which does not require the use of two hands.

Another object of the present invention is the provision of an improved adjustable plier which may be automatically locked in a position and automatically opened.

Another object of the present invention is the provision of an improved adjustable plier which may be locked easily in a particular position and easily unlocked from a particular position.

Another object of the present invention is the provision of an improved adjustable plier which is simple and inexpensive to manufacture and simple to use.

Other and further objects of the invention will be obvious upon an understanding of the illustrative embodiment about to be described, or will be indicated in the appended claims and various advantages not referred to herein will occur to one skilled in the art upon employment of the invention in practice.

DRAWINGS

A preferred embodiment of the invention has been chosen for purposes of illustration and description and is shown in the accompanying drawings forming a part of the specification wherein:

FIG. 1 is a perspective view showing the adjustable plier made in accordance with the present invention.

FIG. 2 is an exploded view showing a preferred construction of the adjustable plier shown in FIG. 1.

FIG. 3 is an enlarged plan view of a means for retaining the jaws in a particular position.

FIG. 4 is a sectional view taken along the line 4—4 of FIG. 1.

FIG. 5 is a plan view showing the adjustable plier in its open position.

FIG. 6 is an enlarged fragmentary view showing a means for unlocking the jaws.

FIG. 7 is a sectional view taken along line 7—7 of FIG. 5.

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FIG. 8 is a sectional view taken along line 8—8 of FIG. 5.

FIG. 9 is a plan view similar to FIG. 5 showing the jaws in their locked position around a work-piece.

DESCRIPTION

Referring to the drawings and more particularly to FIG. 1, the improved self-adjustable pliers 1 of the present invention comprises elongated first and second handle members 2 and 3 respectively. First and second handle member 2 and 3 each have jaw portions 4 and 5, respectively, hand grip portions 6 and 7, respectively, and intermediate neck portions 8 and 9, respectively, connecting the jaw portions 4—5 to the hand grip portions 6 and 7. The jaw portions 4—5 may be provided with a plurality of inner gripping teeth 10 and 11, if desired. The inner gripping teeth 10 and 11 have been shown in the drawings as being straight. However, the gripping teeth 10 and 11 may be curved or otherwise contoured, or they may be eliminated (i.e. no inner teeth on the jaw portions 4—5) without departing from the invention.

The first handle member 2 has an opening 12 in its neck portion 8 into and through which the neck portion 9 of the second handle member 3 is positioned so that jaw portions 4 and 5 and hand grip portions 6 and 7 are in juxtaposition to and opposite to each other. A pin 15 extends from each face of the neck portion 9 of the second handle member 3 and extends through a slot 16 in neck portion 8 of the first handle member 2, as will be discussed in greater detail hereinbelow. When the hand grips 6 and 7 are squeezed, the jaw portions 4 and 5 are moved toward each other as the handle members 2—3 pivot around the pin 15.

A control arm 20 is pivotally mounted at each end to the hand grips 6 and 7 at a point between the neck portion 8 and 9 and the ends 23 and 24 of the hand grips 6—7. The control arm 20 has an end portion 25, a shank portion 29 and a head portion 26. In the drawing the end portion 25 is pivotally mounted to the first handle member 2 substantially midway between the neck portion 8 and the end 23 by a pin 27 extending from hand grip 6. The head portion 26 is larger than the end portion 25 and is pivotally mounted to the second handle member 3 by pin 22 at a point between the neck portion 9 and the end 24 of hand grip 7. It will be noted that with this arrangement when the jaws 4 and 5 are opened the control arm 20 is positioned in the position as shown in FIG. 5. When the jaws 4 and 5 are closed around a work piece W the control arm 20 is moved to the position as shown in FIG. 9.

A first spring member 30 connects the end 25 of the control arm 20 with the neck portion 8 of the first handle member 2 through pins 27 (around which one end is wrapped around) and opening 28 (into which the other end enters). A second spring member 31 connects the shank 29 of the control arm 20 to the neck portion 8 of the second handle member through openings 21 and 35. These springs 30 and 31 exert a contracting force which tends to keep the jaws 4 and 5 in their open position when the springs 30 and 31 are at rest. When the hand grips 6 and 7 are squeezed to close the jaws 4 and 5 around a work piece W, the springs 30 and 31 are stretched. As soon as the hand grips 6 and 7 are released and unlocked, the springs 30 and 31 will contract and will open the jaws 4 and 5. As shown in the drawings the springs 30 and 31 are preferably located on the outside of the handle member 3 and 4 to permit easy access thereto for adjustment, repair, etc.

As will be described in greater detail hereinbelow, the slot 16 is shown as being on both sides of the neck portions 8 of

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the first handle member 2 with the neck portion 9 interposed therebetween. The pivot pin 15 extends through the elongated slot 16 on both sides of the neck portion 8 of the first handle member 2. The elongated slot 16 has one elongated straight, smooth edge 32 and a series of holding notches 33 on the opposite edge 34. When the jaws 4 and 5 are opening or closing, the pin 15 slides along the straight edge 32. When the jaws are to be held in a particular open position, the pin 15 enters one of the holding notches 33 in the opposite edge 34 of the slot 16 in order to keep the jaws 4 and 5 in that particular position. It will be noted that the pin 15 is stationary with respect to the neck portion from which it extends and is preferably round but it can be made in a different shape. The pin 15 enters a notch 33 in the opposite edge 34 of the slot 16 by the action of the handle members 2 and 3 when they are moved toward each other. The pin 15 is disengaged from a notch 33 when the handle members 2 and 3 are moved away from each other.

A locking assembly is provided to ensure that the jaws 4 and 5 are held in a particular predetermined position around a work piece W. The head portion 26 of the control arm 20 has a plurality of teeth 40 opposite the pin 22 on which the head portion 26 pivots. A lock-arm 41 is pivotally mounted on the second handle member 3 by a pin 42. The lock-arm 41 has a lock-point 43 extending therefrom toward the teeth 40 of the control arm 20. A finger piece 44 extends upwardly from the opposite end of the lock-arm 41 and extends beyond the edge of the handle member 3 in order to permit the user to manually move the lock-arm 41 back and forth on pivot 42. The lock-arm 41 has an indentation 46 which cooperates with a pair of spring-pressed moveable knobs 47 extending inwardly from the handle member 3 so that the lock-arm 41 is held in either its forward or rearward position. The lock-arm 41 (and its lock point 43) is biased towards the teeth 40 in control arm 20 by means of spring 45 urging it forward.

When the jaw portions 4 and 5 are moved to grasp a work piece W the lock-arm 41 is manually moved forward as shown in FIG. 9 in order to cause its lock-point 43 to enter one of the teeth 40 in the head 26 of control arm 2. It is held in place by spring 45. This prevents the springs 30 and 31 from opening jaw portions 4 and 5 and locks the jaw portions 4 and 5 in a particular position around the work piece W. To open the jaw portions 4 and 5, the lock-arm 41 is moved manually back to the position shown in FIG. 6. This now removes the lock-point 43 from the teeth 40 in the control arm 20, permitting the springs 30 and 31 to contract and open the jaw portions 4 and 5. If desired, the lock-arm 41 may also be manually moved forward to place the lock point 43 into one of the teeth 40 before the jaw portions 4-5 are pressed together so that when the handle members 2-3 are pressed together the lock-point 43 rides over the various teeth 40 in the head 26 until the jaws close around a work piece W, at which time the lock-point 43 enters a tooth 40 to lock the jaw portions 4 and 5 in position. Hence, the user may lock and unlock the jaw portions 4 and 5 with one hand, thereby leaving the user's other hand free to perform some other function.

FIG. 2 shows the preferred structure of the handle members 2-3 and their component parts as being laminated. However, it will be understood that the handle members 2-3 may be made in one piece or in some other manner than that shown in the drawings without departing from the invention.

The first handle member 3 comprises a pair of one piece outer laminates 50 and 51, a pair of inner hand-grip laminates 52-53 and a pair of inner jaw laminates 54 and 55. The outer laminates 50 and 51 are shown as having jaw, neck and

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hand grip sections 60-61, 62-63, and 65-65 respectively. The inner jaw laminates 54 and 55 conform to the contours of the jaw portions 60 and 61 of the outer laminates 50-51. The hand-grip portions of the inner laminates 52-53 conform in general to the contours of the hand-grip portions 64-65 of the outer laminates 50-51. It will be noted that the inner hand-grip laminates 52-53 and the inner jaw laminates 54-55 are interposed between the outer laminates 50-51 and are held in place by suitable pins 70, 71, 72 and 73. With this construction, the inner hand grip laminates 52 and 53 are longitudinally spaced from the inner portion laminates 54-55 to create the space 12 in the neck portion of the handle members 2 as shown in FIG. 1 and discussed above. The two outer laminates 50-51 each has an elongated slot 16 in neck portions 62. The pin 15 protrudes through both these slots 16. One of the outer laminates 50 has a cut-out 66 to permit the spring to rest therein, and to permit the pin 27 to move therealong. The outer laminate also has an opening 28 to hold one end of the spring 30. The inner laminate 52 adjacent said outer laminate 50 also has a cut-out slot 67 therein which is deeper than the slot 66 of the outer laminate 52 to permit the end 25 of the control arm 20 to ride therein. The other inner laminate 53 has a closed slot 68 into which the pin 27 of the control arm 20 enters and is held therein and permitted to move therein. With this construction, the pin 27 can move up and down within the slot 68 and the end 25 of the control arm 20 is held in place between inner laminate 53 and outer laminate 50 while riding in the slot 67.

The second handle member 3 comprises a pair of hand grip outer laminates 75 and 76, a pair of outer jaw laminates 77 and 78, an inner laminate 79 an inner hand grip laminate 80 and an elongated full size inner laminate 81. The hand grip's outer laminates 75-76 conform to the hand-grip portions 7 of the second handle member 3. The outer jaw laminates 77-78 conform in shape to the jaw portion 4 of the second handle member 3. The elongated full size inner laminate has a jaw portion 82 a neck portion 83 and a hand grip portion 84, which conforms in shape to the shape of the second handle member 3. The inner jaw laminate has a jaw portion 85 and a neck portion 86. The laminates 77 to 86 are mounted together by suitable pins, 87, 88, 42, 22, 90 and 91. It will be noted that there is a space between the outer jaw laminate portions 77-78 and the outer hand grip laminates 75-76. This permits the neck portions 62-64 of the outer laminates 50-57 of the first handle member 2 to lie or move therebetween when the tool is assembled. It will also be noted that there is a space between the inner jaw laminate 79 and the hand-grip laminate 80. This will permit the control arm 20 and the lock-arm 41 to be mounted and to move therewithin. The first jaw laminate 79 and the full size laminate 81 have openings 33 therewithin to accommodate one end of the spring 31. The other end is accommodated in the opening 32 in the control arm 20. It will also be noted that the lock-arm 41 as well as the enlarged head 26 of the control arm 20 and the pressure spring 45 all lie within that same space. The spring-pressed lock knobs 47 are mounted in openings in the outer handgrip laminate 76 and extend through openings 92 in the full size laminate 81 and into the space between the inner jaw laminate 79 and the hand grip laminate 80 so that they will protrude into the indentation 46 in the lock-arm 41 to hold the lock-arms in place.

With this construction it will be seen that when the jaws are to be locked onto a work-piece W (FIG. 9) the jaws 4 and 5 are pushed together by squeezing the handle grips 2 and 3 so that the pin 15 slides along slot 16 until the jaw portions 4-5 are stopped around the work piece W. At this point the pin 15 in the neck portion 9 enters a notch 33 in the other

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neck portion 8 to hold the jaws 4 and 5 together. To ensure that the jaws 4 and 5 are locked in place, the lock-arm 41 is manually moved forward so that the lock-point 43 of the lock arm 41 is inserted into one of the teeth 40 in the head portion 26 in control arm 20 to lock the jaw portions 4 and 5 in that particular position. With this movement, the springs 30-31 are expanded or stretched. The lock-arm 41 is held in place by the lock-knobs 47 in indentation 46 and by the lock spring 45. Alternatively, before the handles 2 and 3 are squeezed, the lock-arm 41 may be manually moved forward to place its lock-point 43 into one of the teeth 40 and is held there by the leaf-spring 45. When the jaw portions 4 and 5 are closed around the work piece W the lock-point 43 will move along the teeth 40 of the control arm 20 until the closing of the jaw portions 4 and 5 is stopped at which point the lockpoint 43 enters a tooth 40 in the head 26 and locks the jaw portions 4 and 5 in place. To open the jaw portions 4 and 5, the lock arm 41 is manually moved away from the head 26 to move the lock-point 43 out of a tooth 40 in head 26. The springs 30-31 contract and the jaws spring open.

It will be thus be seen that the present invention provides an improved adjustable pliers which can be locked in any position with one hand and which does not require the use of two hands, which may be automatically locked in position and automatically opened, which may be locked easily in a particular position and easily unlocked from a particular position and which is simple and inexpensive to manufacture and simple to use.

As many and varied modifications of the subject matter of this invention will become apparent to those skilled in the art from the detailed description given hereinabove, it will be understood that the present invention is limited only as provided in the claims appended hereto.

What is claimed is:

1. Adjustable pliers comprising a pair of handle members, each handle member having a jaw portion, an intermediate portion and a hand-grip portion, said jaw, intermediate and hand-grip portions being rigidly connected together, each of said intermediate portions having a side surface, said handle members intersecting each other and being pivotally mounted to each other whereby movement of the hand grip portions in one direction will move the jaw portions in the same direction, stationary holding means extending from the side surface of one of said intermediate portions, a slot in the side surface of the other of said intermediate portions, said holding means extending into the said slot, said holding means being slidable along the slot, said slot having receiving means adapted to receive the said holding means when the jaw portion are placed in a predetermined position, said holding means being spatially stationary with respect to the side surface of the intermediate portion from which it extends, said holding means comprising a fixed holding pin extending from the side surface of the intermediate portion, said slot being elongated and said receiving means comprising a plurality of notches to permit said holding pin to be received in one of said notches, spring means to open the jaw portions when the holding pin is moved out of a notch, a control arm assembly connecting the hand-grip portions, one end of the control arm assembly is pivotally mounted to one of the hand grip portions, the other end of the control arm assembly has a head portion which is pivotally mounted, to the other hand grip portion, said spring means being interposed between the control arm assembly and the handle members, a lock assembly mounted in one of the handle members in order to lock the jaw portions in position, said lock assembly comprising a lock-point means cooperating with the head

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portion of said control arm assembly in order to maintain the jaw portions in a particular position, the head portion of the control arm assembly having a plurality of indentations along its periphery, said indentations being adjacent to each other spring means being provided adjacent the lock-point means to bias the lock-point means toward the indentations to permit the lock-point means to enter at least one of said indentations in order to lock the jaw portions in position.

2. Adjustable pliers as set forth in claim 1 wherein said handle members comprise laminations mounted together.

3. Adjustable pliers as set forth in claim 1 wherein release means are provided to permit the lock-point means to be moved in the opposite direction to move it away from the indentations.

4. Adjustable pliers as set forth in claim 1 wherein restraining means are provided to restrain the lock-point means in its position toward or away from said indentations.

5. Adjustable pliers set forth in claim 3 wherein said release means extend beyond the handle member to permit manual movement of the lock-point means away from the indentations.

6. Adjustable pliers comprising a pair of handle members, each handle member having a jaw portion, an intermediate portion and a hand-grip portion, each of said intermediate portions having a side surface, said handle members intersecting each other and being pivotally mounted to each other whereby movement of the hand grip portions in one direction will move the jaw portions in the same direction, stationary guide means extending from the side surface of one of said intermediate portions, a slot in the side surface of the other of said intermediate portions, said guide means extending into the said slot, said guide means being slidable along the slot, said guide means being spatially stationary with respect to the side surface of the intermediate portion from which it extends, a control arm assembly connecting the hand grip portions together, one end of the control arm assembly is pivotally mounted to one hand grip portion and the other end of the control arm assembly has a head portion which is pivotally mounted to the other hand grip portion, spring means to bias the jaws to an open position, a lock assembly on one of said handle members to lock the jaw portions in position, said lock assembly comprising a lock-point means in cooperation with the head portion of said control arm assembly in order to maintain the jaw portions in a particular position, the head portion of said control arm assembly having a plurality of indentations along its periphery opposite said lock-point means, said indentations being adjacent to each other and wherein spring means are provided adjacent the lock-point means to move the lock-point means into one of said indentations in order to lock the jaw portions in position.

7. Adjustable pliers as set forth in claim 6 wherein release means are provided to permit the lock-point means to be moved in the opposite direction to move it away from the indentations.

8. Adjustable pliers as set forth in claim 6 wherein restraining means are provided to restrain the lock-point means in its position toward or away from the said indentations.

9. Adjustable pliers as set forth in claim 7 wherein said release means extend beyond the handle member to permit manual movement of the lock-point means away from the indentation.

10. Adjustable pliers as set forth in claim 6 where in said handle members comprise laminations mounted together.

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(12) **Patent Application Publication** (10) **Pub. No.: US 2003/0233119 A1**
Tiedemann (43) **Pub. Date: Dec. 18, 2003**

(52) U.S. Cl. 606/210

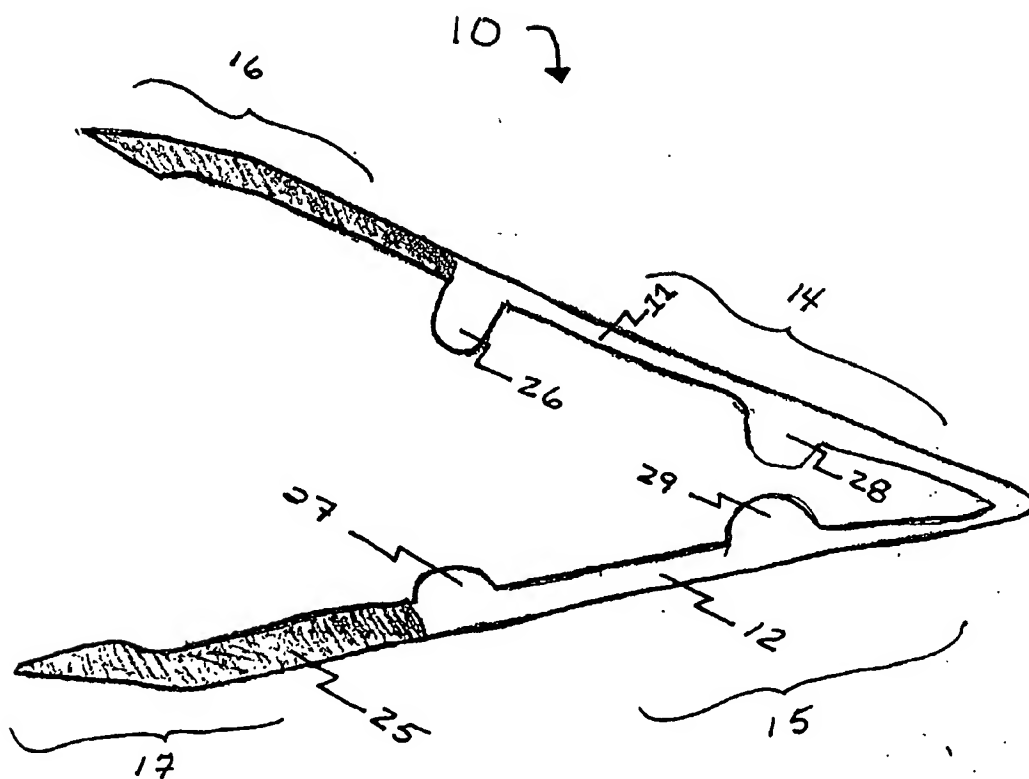
(57) **ABSTRACT**

The present invention provides a port deaccessor comprising a forceps apparatus having a pair of arms, each having proximal and distal end portions and a middle portion spaced about halfway between the proximal and distal ends. A hinge connects the proximal portions of the arms. The distal ends provide respective distal tip portions coated with a non-stick coating such that secure placement of the distal ends of the port deaccessor around the diameter of a needle associated with an in-dwelling port or other venous line is enhanced to provide a safe and efficient means to remove the needle.

(22) Filed: **Jun. 18, 2002**

Publication Classification

(51) **Int. Cl.⁷** **A61B 17/50**



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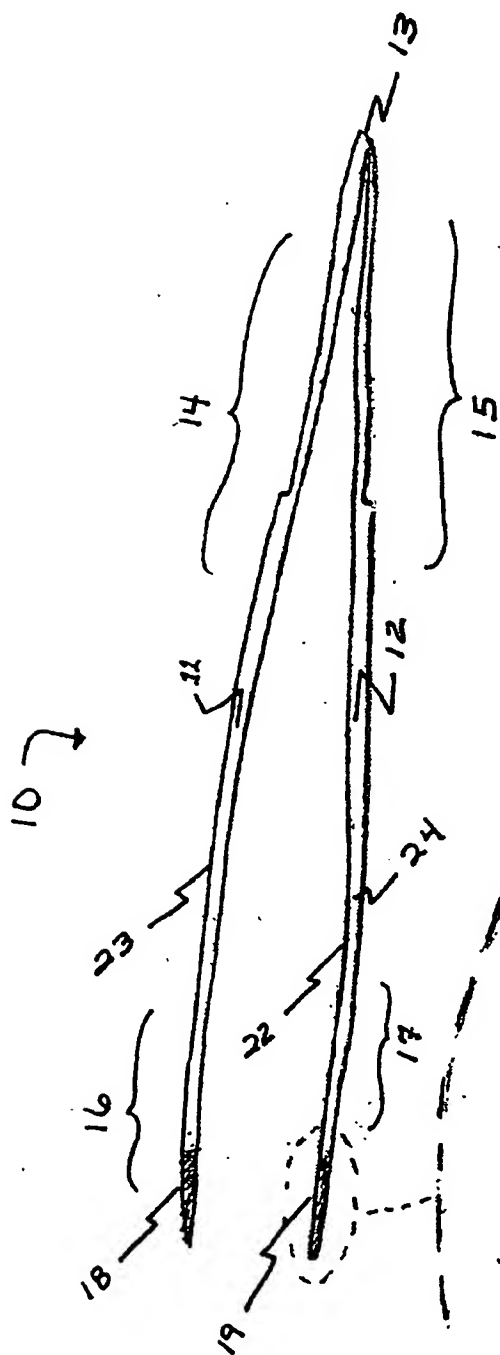


FIG. 1

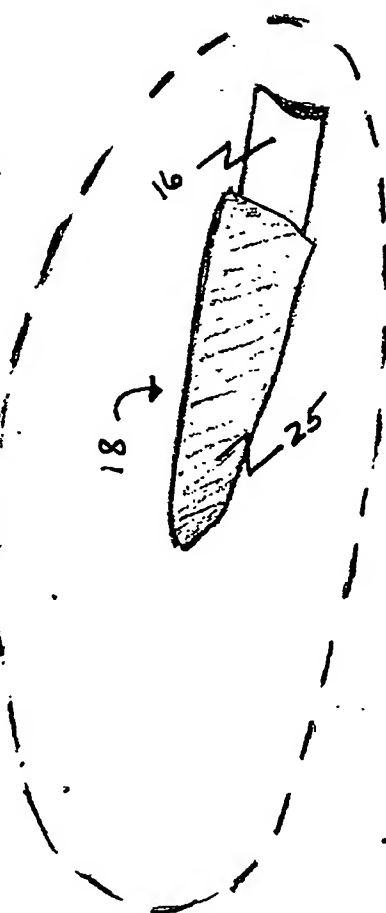


FIG. 2

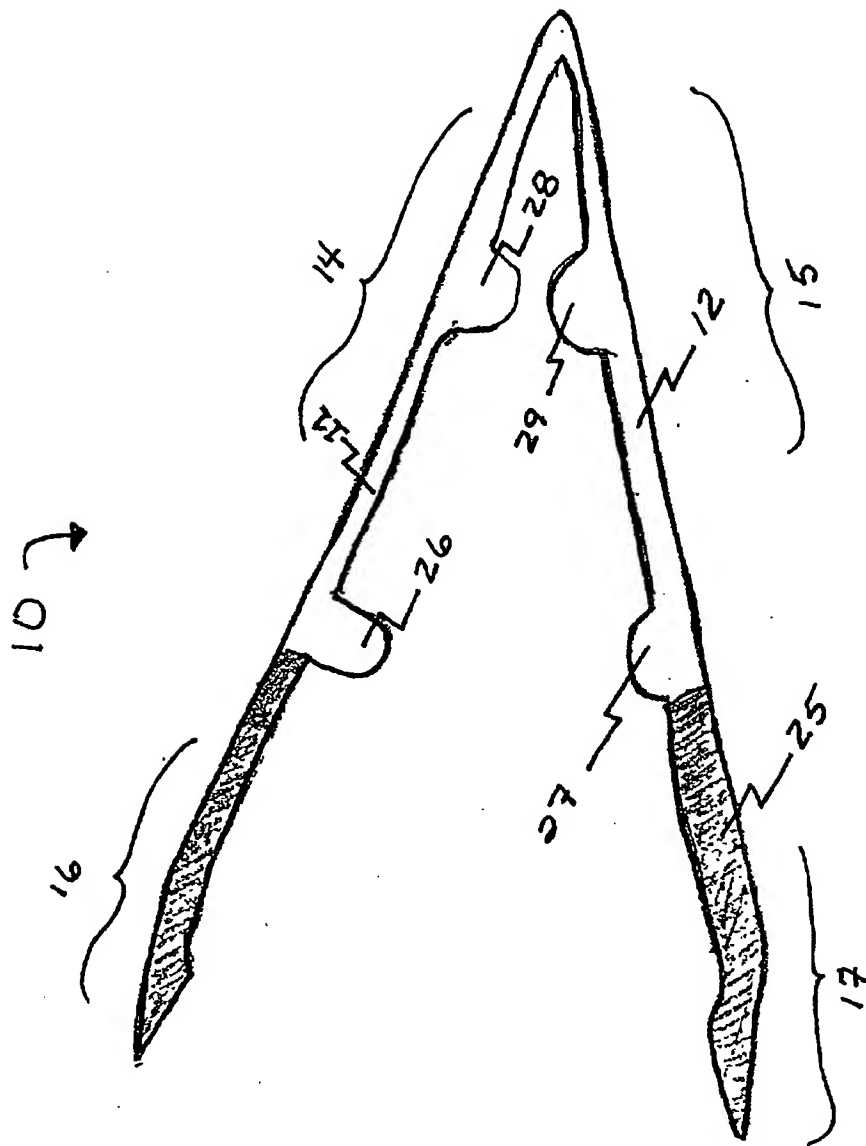


FIG. 3

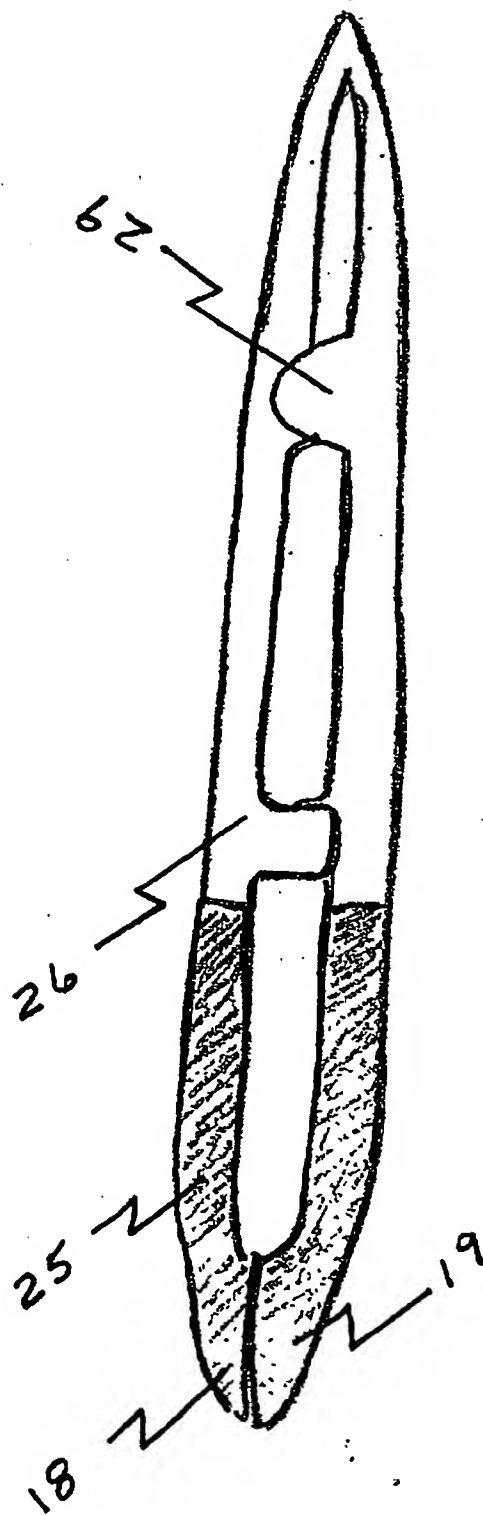


FIG. 4

PORT DEACCESSOR AND METHODS OF USE

FIELD OF THE INVENTION

[0001] The present invention relates generally to a medical device. More specifically, the present invention provides a port deaccessor comprising a forceps apparatus having a pair of arms, each having proximal and distal end portions and a middle portion spaced about halfway between the proximal and distal ends, and further including a non-slip coating on the distal ends such that placement of the distal ends of the forceps apparatus around the diameter of a port needle is secured. Use of the port deaccessor permits a caregiver to efficiently remove or deaccess the port needle from the patient's port while protecting the caregiver from an inadvertent needlestick with the contaminated needle during the removal process.

BACKGROUND OF THE INVENTION

[0002] There are a number of implantable devices, or central venous lines, known in the conventional medical arts for gaining access to the circulatory system of a patient, when such access is required on a more than temporary basis. For example, a Peripherally Inserted Central (PIC) catheter is a line inserted by a medical practitioner into the patient's basilic or cephalic vein and then advanced into the region of the superior vena cava. The PIC, secured by means of sutures or steri-strips, is typically used for the infusion of solutions, medications, blood or blood products, and the like, as well as for obtaining blood samples from the patient without requiring additional needlesticks. Another type of central venous device, known commonly as a port, is totally implanted under the skin of a patient over a bony prominence. A port consists of two major components: a catheter, with the tip advanced into the region of the superior vena cava, and a septum, which is attached to the catheter. The septum is accessed through the patient's skin by a special port needle, one common type of which is called a Huber needle. Once the port insertion site is healed, maintenance in patients receiving on-going therapy includes changing the port needle at regular intervals.

[0003] Current methods used by medical practitioners to change the port needle usually involve placing the thumb and index finger of one hand around the diameter of the port to secure the port, while simultaneously removing or deaccessing the needle with the other hand. However, the pressure required to remove the needle from the port often causes a rebound effect on the needle. Because of this effect the practitioner is at risk of being stuck with the contaminated needle, especially in the thumb or index finger still positioned around the diameter of the port.

[0004] Percutaneous injuries from needlesticks are a serious concern for the approximately 10 million healthcare workers in the United States alone because of the significant risk of occupational transmission of bloodborne pathogens like human immunodeficiency virus (HIV) and Hepatitis B virus, among others. Indeed, according to the Centers for Disease Control and Prevention (CDC), approximately 384,000 percutaneous injuries occur annually in U.S. hospitals, with about 236,000 of these resulting from needlesticks involving hollow-bore needles. Because the majority of the accidental needlesticks occur after the device has been used, and often when removing or deaccessing the device from the

patient, there is a need for an improved method for the safe removal of needles, especially those associated with indwelling central venous lines. The present invention, directed to an improved forceps apparatus and method of use, provides just such a safe and convenient method for deaccessing port needles and other venous lines from a patient.

[0005] Conventional forceps are well known in the medical arts. Examples range from simple tweezers-like forceps, used to remove splinters from the skin of a patient, to more complex designs particularly adapted for a variety of medical uses. For example, U.S. Pat. No. 6,146,139 to Harrison, III discloses a forceps apparatus having particular utility in the removal of small teeth. Harrison's forceps comprise a pair of limbs having proximal, middle, and distal portions with each distal portion concavely shaped to conform to, and grip, a tooth during use.

[0006] U.S. Pat. No. 6,371,973 to Tapper discloses a forceps useful in the intrabody positioning of a medical instrument or device. Tapper's forceps comprise a first and second arm, each including a finger holding portion, a pivot portion, and a tissue holding portion, wherein the first pivot portion is attached to the second pivot portion so as to form a pivot point about which the arms co-rotate in a scissor-like motion from a grasping position to an open position and visa-versa, and where the finger-holding positions are both positioned on one side of a plane defined by the length of the first arm, the plane being perpendicular to the scissor-like motion.

[0007] Other innovations relating to medical forceps include forceps useful for vascular surgery disclosed by Saavedra in U.S. Pat. No. 6,261,308. Saavedra discloses forceps useful as vascular clamps, allowing a vascular surgeon to close torn veins while allowing the clamp to remain in place without damaging the veins.

[0008] U.S. Pat. Nos. 6,280,458, 6,245,070, and 6,293,946 also disclose improved forceps directed to a variety of medical applications. For example, U.S. Pat. No. 6,280,458 to Boche et al. discloses a surgical and holding forceps having a shaft, at least two mouth parts, and a grip that is in working engagement with a mechanism for opening and closing the mouth parts. The mechanism is acted upon by spring force such that the mouth parts are pushed in a closing direction.

[0009] U.S. Pat. No. 6,245,070 to Marquis et al., disclosing a tissue removal device used with a standard Kleppinger bipolar forceps, includes a cleaning element held on a tube fitting over the Kleppinger forceps tubes and useful for the removal of coagulated tissue from between the forceps blades.

[0010] Thorne, in U.S. Pat. No. 6,293,946, discloses non-stick forceps useful in performing electrosurgery and comprising forceps including two electrodes, each having a tip composed of a material having the characteristics of electrical conductivity, high thermal diffusivity, and histocompatibility.

[0011] Thus, while the foregoing body of prior art indicates it to be well known to make forceps for a variety of medical applications, the prior art described above does not teach or suggest a forceps apparatus having a pair of arms, each having proximal and distal end portions and a middle

portion spaced about halfway between the proximal and distal ends, wherein the distal ends further include a non-slip coating such that secure placement of the distal ends of the forceps apparatus around the diameter of a port needle, like a Huber needle, is enhanced to aid a medical practitioner in the safe and efficient removal of the port from a patient.

SUMMARY OF THE INVENTION

[0012] Briefly described, the present invention generally relates to a forceps apparatus and, more specifically, to a forceps apparatus having distal ends coated with a non-slip coating whereby the distal ends of the forceps are securely placing around the diameter of a medical device, such as a port needle, to permit caregivers to remove or deaccess the needle from the patient's port quickly and safely while simultaneously protecting the caregiver from an inadvertent needlestick during the removal process.

[0013] More specifically, one embodiment of a forceps apparatus made according to the present invention comprises a pair of arms, each having proximal and distal end portions and a middle portion spaced about halfway between the proximal and distal ends, wherein the distal ends further include a non-slip coating such that secure placement of the distal ends of the forceps apparatus around the diameter of a port needle is enhanced.

[0014] In another embodiment of the present invention, a forceps apparatus is contemplated that is suitable for a one-time use and is thus suitably disposed of following use of the disposable forceps apparatus to remove a port needle from the patient's port.

[0015] Yet another embodiment contemplated to be within scope of the present invention comprises a forceps apparatus having a pair of arms, each having proximal and distal end portions and a middle portion spaced about halfway between the proximal and distal ends wherein the distal ends further include a non-slip coating such that secure placement of the distal ends of the forceps apparatus around the diameter of a port needle is enhanced, and further including a first stop and a second stop, whereby each of the first and second stops is fixedly positioned on the inside concave surface of the middle portion of each arm oppositely to the other stop, such that the user can only force the arms of the forceps apparatus together to a point wherein the first stop engages the second stop.

[0016] These and other objects, features, and advantages of the present invention will become more apparent upon review of the detailed description set forth below when taken in conjunction with the accompanying figures, which are briefly described as follows.

BRIEF DESCRIPTION OF THE FIGURES

[0017] A full and enabling disclosure of the present invention, including the best mode thereof, to one of ordinary skill in the art, is set forth more particularly in the remainder of the specification, including reference to the accompanying figures, wherein:

[0018] FIG. 1 is a perspective view of one embodiment of a port deaccessor according to the present invention.

[0019] FIG. 2 is an enlarged view of one of the tip sections of the port deaccessor of FIG. 1.

[0020] FIG. 3 is a side view of an alternate embodiment of the present invention showing the port deaccessor in an open position.

[0021] FIG. 4 illustrates the port deaccessor of FIG. 3 in a closed position.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0022] Other objects, features and aspects of the present invention are disclosed in, or are obvious from, the following Detailed Description. It is to be understood by one of ordinary skill in the art that the present discussion is a description of exemplary embodiments only and is not intended as limiting the broader aspects of the present invention, which broader aspects are embodied in the exemplary construction. In fact, it will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the scope or spirit of the invention. For instance, features illustrated or described as part of one embodiment can be used in another embodiment to yield a still further embodiment. It is intended that the present invention cover such modifications and variations as come within the scope of the appended claims and their equivalents.

[0023] The present invention provides an improved medical device useful for aiding a practitioner in the safe and efficient removal of a needle associated with an in-dwelling line or other venous port in a patient. Specifically, the port deaccessor of the present invention provides a forceps apparatus comprising a pair of arms, each having proximal and distal end portions and a middle portion spaced about halfway between the proximal and distal ends, and further including a non-slip coating on the distal ends such that secure placement of the distal ends of the forceps apparatus around the diameter of a needle like a port needle is enhanced. The use of the port deaccessor also facilitates the safe removal of a needle associated with a port or other venous device by protecting a practitioner from an inadvertent needlestick caused by a rebound effect during needle removal.

[0024] Referring now to FIGS. 1-4, port deaccessor 10 constructed in accordance with the principals of the present invention is generally illustrated. Port deaccessor 10 comprises a pair of arms 11, 12, each comprising respective proximal end portions 14, 15, respective distal end portions 16, 17, and having respective middle portions spaced about halfway between the proximal and distal ends. Proximal ends 14, 15 communicate with hinge 13. Distal end portions 16, 17 further include respective tips 18, 19 comprising a non-slip coating ensuring secure placement of the distal ends of the forceps apparatus.

[0025] Referring now to FIG. 1, illustrating one embodiment of a port deaccessor made according to the present invention, the combination of arms 11, 12 and hinge 13 can be configured such that each arm curves toward the other allowing each of tips 18, 19 to abut the other when port deaccessor 10 is in a closed position. Arms 11 thus provide concave surface 21 and convex surface 23. Similarly, arm 12 provides concave surface 22 and convex surface 24. When the practitioner forces arms 11 and 12 into a closed position, concavity 21 of arm 11 faces concavity 22 of arm 12 forcing

tips 18 and 19 to converge to grip a diameter of a port needle to permit securing the needle such that removal is effectuated.

[0026] Referring now to FIG. 2, an enlarged view of one of the tip sections of port deaccessor 10 is shown, illustrating non-slip coating 25 enveloping tip 18 of distal end 16. Compositions suitable for use for non-slip coating 25 according to the present invention include, but are not limited to, rubber including synthetic rubber products, polysulfide rubbers, silicone rubbers, urethane and urethane resins, polyurethane, plastic resins including epoxy resins, polyvinylchloride, polyacrylics, polycarbonates, and the like, and mixtures thereof. One commercially available composition suitable to provide a non slip coating on the distal tips of a forceps apparatus of the present invention is LIQUID RUBBER distributed by N. J. Sarra (142 Oak Brook Commons, Clifton Park, N.Y. 12065).

[0027] One embodiment of the present invention, illustrated in FIG. 3, contemplates port deaccessor 10 to be a forceps apparatus, measuring about 5 inches in length, and comprising arms 11, 12 and hinge 13 to be a one-piece injection molded construction. Optionally, at least one of arm 11 or 12 can include at least one stop 26 oppositely positioned to at least one slot 27 positioned on the other arm such that stop 26 engages slot 27 when a practitioner forces arms 11 and 12 into a closed position, as illustrated in FIG. 4. The present invention further contemplates port deaccessor 10 to comprise a forceps apparatus having slot 26 on distal portion 16 of arm 11 and positioned opposite to stop 27 on distal portion 17 of arm 12, while slot 29 is positioned on proximal portion of arm 12 and oppositely situated to stop 28 on proximal portion 14 of arm 11. When the practitioner forces port deaccessor 10 into a closed position, as illustrated in FIG. 4, stops 27 and 28 engage respective slots 26 and 29 allowing distal tips 18 and 19 to abut.

[0028] Suitable compositions for use in manufacturing the forceps apparatus of port deaccessor 10 include, but are not limited to, epoxy resins, plastic compositions, polyacrylics, polycarbonates, polyvinylchloride, and the like and mixtures thereof. A forceps apparatus comprising a plastic composition suitable for use in the present invention is also available commercially (EMS Medical Group Ltd., Stonehouse, Glos., England and Molded Products, Harlan Iowa, among others) and can be coated with non-stick coating by immersing distal tips 18 and 19 into a suitable rubber composition such as LIQUID RUBBER, one tip at a time, following manufacturer's directions and for approximately 10 seconds, and allowing the LIQUID RUBBER to dry. Port deaccessor 10 contemplates applying one or more coats of a non-stick coating in this fashion to provide a non-slip coating on the distal end portions of the forceps apparatus.

[0029] The port deaccessor provided according to the present invention provides an improved method and apparatus for safely removing needle associated with a port or other venous line from a patient by providing a forceps apparatus having a pair of arms, each having proximal and distal end portions and a middle portion spaced about halfway between the proximal and distal ends, and further including a non-slip coating on the distal ends such that

secure placement of the distal ends of the forceps apparatus around the diameter of the needle is enhanced. The needle is then removed or deaccessed from the port by squeezing the arms of the port deaccessor together with one hand, around the diameter of the needle, while deaccessing the needle from the port with the other hand. Use of the port deaccessor to deaccess a needle from the port decreases the possibility that the practitioner will suffer an inadvertent needlestick caused by needle rebound because the needle will stick into the port deaccessor's rubber coating.

[0030] While the invention has been described with reference to specific methods and embodiments, such description is for illustrative purposes only. The words used are words of description rather than of limitation. It is to be understood that changes and variations may be made by those of ordinary skill in the art without departing from the spirit or scope of the present invention, which is set forth in the following claims.

What is claimed is:

1. A port deaccessor comprising:
 - a) a pair of curved limbs, each limb extending along longitudinal lines and having proximal and distal end portions and a middle portion spaced about midway in between said proximal and distal end portions, and each limb having an inside concave surface and an outer convex surface, the convex surfaces being each curved to continuously engage the thumb and forefinger of a user when the user places the forceps between the thumb and forefinger;
 - b) a hinge that connects the proximal ends of the limbs together;
 - c) the distal ends of the limbs providing respective gripping tip portions that are concavely shaped to conform to and grip a port diameter during use; and
 - d) each distal end further comprising a non-slip coating to secure the grip around the port diameter during use.
2. The port deaccessor of claim 1 wherein the limbs are of the same length.
3. The port deaccessor of claim 1 wherein each limb is about 2.5-7 inches in length.
4. The port deaccessor of claim 1 wherein each limb is about 5 inches in length.
5. The port deaccessor of claim 1 wherein the hinge and limbs are configured as an integral unit.
6. The port deaccessor of claim 1 comprising a plastic composition selected from the group comprising polyvinylchloride; epoxy resins; polyacrylics; polycarbonates and mixtures thereof.
7. The port deaccessor of claim 1 wherein the non-slip coating comprises a coating selected from the group comprising rubber; silicone rubber; urethane; polyurethane; an epoxy resin; polyvinylchloride; polyacrylic; polycarbonate; and mixtures thereof.
8. The port deaccessor of claim 1 wherein the non-slip coating comprises a rubber coating.

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x RELATED PROCEEDINGS APPENDIX

There are no known proceedings that relate to this application.